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Chaining Behavior in Urban Tripmaking: Appendices to Interim Report

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**Chaining Behavior in Urban Tripmaking:
Appendices to Interim Report**

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APPENDIX A

CHAINS SOURCE LISTING

```
1.000 C      TROOPER - DRIVER PROGRAM - VERSION A (WINDHAM)
2.000 C
3.000 C-----
4.000 C
5.000 C      CHAINING BEHAVIOR IN URBAN TRIP MAKING
6.000 C
7.000 C      C H A I N S
8.000 C
9.000 C      Complex Household Activity Interaction Simulator
10.000 C
11.000 C      Module # 1 -- TROOPER
12.000 C      (Version TROOP:A   Dec.1,1982)
13.000 C
14.000 C      Analysis of Household Interaction and
14.100 C      Generation of Household Activity Programs
15.000 C
16.000 C      W.W.RECKER  M.G.MCNALLY  G.S.ROOT
17.000 C
18.000 C      Department of Civil Engineering and
19.000 C      Institute of Transportation Studies
20.000 C      University of California,Irvine
21.000 C
22.000 C      PROGRAMMED BY: M.G.MCNALLY AND W.W.RECKER (9/81)
23.000 C      MODIFIED BY:   M.G.MCNALLY B(11/81) C(5/82) D(9/82)
24.000 C-----
25.000 C
26.000      WRITE(108,800)
27.000      800 FORMAT(
28.000      .12X,52H***** TROOPER *****/
29.000      .12X,52H* */
30.000      .12X,52H*      CHAINING BEHAVIOR IN URBAN TRIP MAKING */
31.000      .12X,52H* */
32.000      .12X,52H*      C H A I N S */
33.000      .12X,52H* */
34.000      .12X,52H* Complex Household Activity Interaction Simulator */
35.000      .12X,52H* */
36.000      .12X,52H*      Module # 1 -- TROOPER */
37.000      .12X,52H*      (Version TROOP:A   Oct.6,1981) */
38.000      .12X,52H* */
39.000      .12X,52H*      Analysis of Household Interaction and */
40.000      .12X,52H*      Generation of Household Activity Programs */
41.000      .12X,52H* */
42.000      .12X,52H*      W.W.RECKER  M.G.MCNALLY  G.S.ROOT */
43.000      .12X,52H* */
44.000      .12X,52H***** TROOPER *****/
45.000 C-----
46.000 C (1) CONSTRUCT TRAVEL MATRICES
47.000 C      CALL MAPPER
48.000 C      CALL LAPPER
49.000 C      CALL BOOGIE
50.000 C      CALL WOOGIE
51.000 C (2) ANALYSIS OF HOUSEHOLD TRAVEL DIARIES
52.000 C      (ACTIVITY PROGRAMS AND OBSERVED PATTERNS)
53.000 C      CALL LISTER
54.000 C (3) SPECIFICATION OF HOME TRANSITION POINTS
55.000 C      CALL TICKER
56.000 C-----
57.000      STOP
58.000      END
```

```
.100      SUBROUTINE LISTER
1.000 C   THIS PROGRAM CONSTRUCTS THE INPUT DATA FOR SNOOPER
2.000 C
3.000 C   SET F:1/GRKEY*IN
4.000 C       F:5/NEWWINDATA*IN
5.000 C       F:6/WIND:ACT*OUT*SAVE
6.000 C
7.000      DIMENSION K(10,10),MAP(342),ICCODE(10),NL(10),RLD(10),RHH(10)
8.000      COMMON/ST/HH(10),LD(10),LD(10),TS(10),TA(10),IFRQ(10),NFI(10),
9.000      *NP0(10),ETL(10),TLR(10),FST(10),FET(10),WTR(10),WTA(10),
10.000     *IMP(10),KNOW(10),FN(10),IHNN(10),DUR(10),I
11.000 C
12.000     DATA (ICCODE(I),I=1,10)/607,703,704,707,713,801,804,
13.000     *
14.000 C
15.000     DATA (MAP(L),L=1,5)/607001,607002,607003,607004,607101/
16.000     DATA (MAP(L),L=6,10)/607102,607103,607104,607105,607106/
17.000     DATA (MAP(L),L=11,15)/607107,607108,607109,607110,607111/
18.000     DATA (MAP(L),L=16,20)/607112,607113,607200,607201,607202/
19.000     DATA (MAP(L),L=21,25)/607203,607204,607205,607206,607207/
20.000     DATA (MAP(L),L=26,30)/607208,607209,607210,607211,607212/
21.000     DATA (MAP(L),L=31,35)/607213,607214,607215,607216,607217/
22.000     DATA (MAP(L),L=36,38)/607218,607219,703001/
23.000     DATA (MAP(L),L=39,43)/703101,703102,703103,703200,703201/
24.000     DATA (MAP(L),L=44,48)/703202,703203,703204,703205,703206/
25.000     DATA (MAP(L),L=49,53)/703207,703208,703209,703210,704001/
26.000     DATA (MAP(L),L=54,58)/704002,704003,704101,704102,704103/
27.000     DATA (MAP(L),L=59,63)/704104,704105,704106,704107,704108/
28.000     DATA (MAP(L),L=64,68)/704109,704110,704112,704200,704201/
29.000     DATA (MAP(L),L=69,73)/704202,704203,704204,704205,704206/
30.000     DATA (MAP(L),L=74,78)/704207,704208,704209,704210,704211/
31.000     DATA (MAP(L),L=79,83)/704212,704213,704214,704215,704216/
32.000     DATA (MAP(L),L=84,88)/704217,704218,704219,704220,707001/
33.000     DATA (MAP(L),L=89,93)/707002,707003,707004,707005,707101/
34.000     DATA (MAP(L),L=94,98)/707102,707103,707104,707105,707107/
35.000     DATA (MAP(L),L=99,103)/707108,707109,707110,707111,707112/
36.000     DATA (MAP(L),L=104,108)/707113,707114,707200,707201,707202/
37.000     DATA (MAP(L),L=109,113)/707203,707204,707205,707206,707207/
38.000     DATA (MAP(L),L=114,118)/707208,707209,707210,707211,707212/
39.000     DATA (MAP(L),L=119,123)/707213,707214,707215,707216,707217/
40.000     DATA (MAP(L),L=124,128)/707218,707219,707220,707221,707222/
41.000     DATA (MAP(L),L=129,133)/713001,713002,713003,713101,713102/
42.000     DATA (MAP(L),L=134,138)/713103,713104,713105,713106,713107/
43.000     DATA (MAP(L),L=139,143)/713108,713201,713202,713203,713204/
44.000     DATA (MAP(L),L=144,148)/713205,713206,713207,713208,713209/
45.000     DATA (MAP(L),L=149,153)/713210,713211,713212,713213,713214/
46.000     DATA (MAP(L),L=154,158)/713215,713216,713217,713218,713219/
47.000     DATA (MAP(L),L=159,163)/713220,713221,713222,801001,801002/
48.000     DATA (MAP(L),L=164,168)/801101,801102,801103,801104,801105/
49.000     DATA (MAP(L),L=169,173)/801106,801107,801200,801201,801202/
50.000     DATA (MAP(L),L=174,178)/801203,801204,801205,801206,801207/
51.000     DATA (MAP(L),L=179,183)/801208,801209,801210,801211,801212/
52.000     DATA (MAP(L),L=184,188)/801213,801214,801215,801216,801217/
53.000     DATA (MAP(L),L=189,193)/801218,801219,801220,801221,801222/
54.000     DATA (MAP(L),L=194,198)/801223,801224,801225,801226,801227/
55.000     DATA (MAP(L),L=199,203)/801228,804001,804101,804102,804103/
56.000     DATA (MAP(L),L=204,208)/804104,804200,804201,804202,804203/
57.000     DATA (MAP(L),L=209,213)/804204,804205,804206,804207,804208/
58.000     DATA (MAP(L),L=214,218)/804209,804210,804211,804212,806001/
59.000     DATA (MAP(L),L=219,223)/806002,806101,806102,806103,806104/
60.000     DATA (MAP(L),L=224,228)/806105,806106,806107,806108,806109/
61.000     DATA (MAP(L),L=229,233)/806110,806111,806112,806113,806114/
```

```

63.000 DATA (MAP(L),L=239,243)/811104,811200,811201,811202,811203/
64.000 DATA (MAP(L),L=244,248)/811204,811205,811206,811207,811208/
65.000 DATA (MAP(L),L=249,253)/811209,811210,811211,814001,814002/
66.000 DATA (MAP(L),L=254,258)/814003,814004,814101,814102,814103/
67.000 DATA (MAP(L),L=259,263)/814104,814105,814106,814107,814108/
68.000 DATA (MAP(L),L=264,268)/814200,814201,814202,814203,814204/
69.000 DATA (MAP(L),L=269,273)/814205,814206,814207,814208,814209/
70.000 DATA (MAP(L),L=274,276)/814210,814211,814212/

```

```

71.000 C
72.000 DATA (MAP(L),L=277,293)/203,208,209,210,211,212,214,216,217,
73.000 * 218,219,221,224,226,227,228,229/
74.000 DATA (MAP(L),L=294,298)/403,405,406,411,413/
75.000 DATA (MAP(L),L=299,316)/601,602,604,605,606,607,608,609,611,
76.000 * 612,613,614,616,617,618,619,620,621/
77.000 DATA (MAP(L),L=317,329)/701,702,703,704,705,706,707,708,709,
78.000 * 710,711,712,713/
79.000 DATA (MAP(L),L=330,342)/801,802,803,804,805,806,807,808,809,
80.000 * 810,811,812,814/

```

```

81.000 C
82.000 C
83.000 C

```

```

84.000 1 READ(1,3)KHHN,KPN
85.000 3 FORMAT(2I5)
86.000 9 DAY=24.50
87.000 I=0
88.000 10 I=I+1

```

```

89.000 READ(5,12)NTYPE,HH(I),LO(I),LD(I),TS(I),TA(I),IFRQ(I),NPI(I),
90.000 *NPO(I),ETL(I),TLR(I),FST(I),FET(I),WTB(I),WTA(I),IMP(I),
91.000 *KNOW(I),PN(I),IHNN(I)
92.000 12 FORMAT(I1,2X,I2,2I6,2F4.2,I1,2X,2I2,4F4.2,2F3.2,I1,3X,I1,
93.000 *2X,I1,13X,I3)
94.000 14 PPN=PN(1)
95.000 IF(IHNN(I).NE.KHHN)GO TO 33
96.000 15 I=I+1
97.000 READ(5,12)NTYPE,HH(I),LO(I),LD(I),TS(I),TA(I),IFRQ(I),NPI(I),
98.000 *NPO(I),ETL(I),TLR(I),FST(I),FET(I),WTB(I),WTA(I),IMP(I),
99.000 *KNOW(I),PN(I),IHNN(I)

```

```

100.000 IF(PN(I).NE.PPN)GO TO 30
101.000 IF(HH(I-1).NE.16.)GO TO 20

```

```

102.000 C
103.000 C TEST FOR MANDATORY HOME ACTIVITY
104.000 C

```

```

105.000 IF(TLR(I-1).LE.TS(I))GO TO 25
106.000 I=I-1
107.000 GO TO 15
108.000 20 IF(FET(I-1).EQ.0.0)GO TO 22
109.000 DUR(I-1)=FET(I-1)-FST(I-1)
110.000 IF(DUR(I-1).LT.0.0)GO TO 23
111.000 CHK=TA(I-1)-FST(I-1)
112.000 IF(CHK.GT.0.50)GO TO 21
113.000 GO TO 15
114.000 21 FST(I-1)=0.0
115.000 FET(I-1)=0.0
116.000 22 IF(FST(I-1).GT.TA(I-1))GO TO 24
117.000 DUR(I-1)=TS(I)-TA(I-1)
118.000 GO TO 15
119.000 24 DUR(I-1)=TS(I)-FST(I-1)
120.000 IF(DUR(I-1).LT.0.0)DUR(I-1)=(24.00-FST(I-1))+TS(I)
121.000 GO TO 15
122.000 23 DUR(I-1)=(24.00-FST(I-1))+(FET(I-1))
123.000 GO TO 15
124.000 25 IF(TA(I-1).GT.TLR(I-1))TLR(I-1)=TA(I-1)
125.000 IF(ETL(I).EQ.0.0)ETL(I)=TLR(I-1)+.25
126.000 DUR(I-1)=ETL(I)-TLR(I-1)

```

```

129.000      GO TO 15
130.000      33 I=I+1
131.000      READ(5,12)NTYPE,HH(I),LD(I),LD(I),TS(I),TA(I),IFRQ(I),
132.000      *NPI(I),NPO(I),ETL(I),TLR(I),FST(I),FET(I),WTB(I),WTA(I),
133.000      *IMP(I),KNOW(I),PN(I),IHNN(I)
134.000      IF(IHNN(I),EQ,IHNN(I-1))GO TO 33
135.000      CALL STORE
136.000      I=1
137.000      DAY=24,50
138.000      GO TO 14
139.000      30 IF(PPN,EQ,KPN)GO TO 35
140.000      CALL STORE
141.000      DAY=24,50
142.000      I=1
143.000      GO TO 14
144.000 C
145.000      35 NFILE=I-2
146.000      IF(TLR(NFILE+1),NE,0,0)DAY=TLR(NFILE+1)
147.000      IF(TLR(NFILE+1),LT,TA(NFILE+1))DAY=TA(NFILE+1)
148.000      IPPN=PPN
149.000      DO 44 KX=1,276
150.000      IF(MAP(KX),NE,LO(1)) GO TO 44
151.000      IZONE=KX
152.000      GO TO 45
153.000      44 CONTINUE
154.000      45 WRITE(6,38)IHNN(I-1),IPPN,NFILE,IZONE,ETL(1),DAY
155.000      38 FORMAT(4I5,2F7,2)
156.000 C
157.000 C      MAP CODED LOCATIONS TO DISTANCE MATRIX NOTATION
158.000      DO 7 J=1,NFILE
159.000 C
160.000      LL=LD(J)/1000
161.000      DO 27 JJ=1,10
162.000      IF(LL,EQ,ICODE(JJ))GO TO 37
163.000      27 CONTINUE
164.000      DO 47 JJ=277,342
165.000      IF(MAP(JJ),NE,LL)GO TO 47
166.000      NL(J)=JJ
167.000      GO TO 7
168.000      47 CONTINUE
169.000 C
170.000      37 DO 17 JJ=1,276
171.000      IF(MAP(JJ),NE,LD(J))GO TO 17
172.000      NL(J)=JJ
173.000      GO TO 7
174.000      17 CONTINUE
175.000      7 CONTINUE
176.000 C
177.000      R=0.
178.000      DO 70 JJ=1,NFILE
179.000      R=R+1.0
180.000      RLD(JJ)=NL(JJ)
181.000      RHH(JJ)=HH(JJ)
182.000      70 WRITE(6,75)R,FST(JJ),FET(JJ),DUR(JJ),RLD(JJ),RHH(JJ),WTB(JJ),
183.000      *WTA(JJ),NPI(JJ),NPO(JJ),IMP(JJ),IFRQ(JJ),KNOW(JJ)
184.000      75 FORMAT(8F7,2,5I3)
185.000      DO 200 JJ=1,NFILE
186.000      DO 190 J=1,NFILE
187.000      190 K(JJ,J)=0
188.000      200 WRITE(6,80)(K(JJ,J),J=1,NFILE)
189.000      80 FORMAT(6I2)
190.000      CALL STORE
191.000      I=1
192.000      DAY=24,50
193.000      READ(1,3,END=49)KHNN,KPN

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```
195.000 69 WRITE(6,85)
196.000 85 FORMAT('END OF FILE')
197.000 RETURN
198.000 END
```

*

*E XTICKER
*TY

```
.100      SUBROUTINE TICKER
1.000 C   THIS PROGRAM DETERMINES THE NUMBER OF PEOPLE AT HOME
2.000 C   THROUGHOUT THE ENTIRE DAY
3.000 C
4.000 C
5.000     DIMENSION HH(15,15),TS(15,15),TA(15,15),PN(15,15),NN(15),
6.000     *TLH(15,10),TAH(15,10),MM(15),JJ(15),TL(15,10),TR(15,10),
7.000     *IHHSIZE(30),T(30),TLMIN(15),TRMIN(15),A(79),TMIN(15),JN(15),
7.050     *LN(15),IP(10)
7.250 C
7.500 C   BEGIN TEST FOR CORRECT HOUSEHOLD
7.750 C
8.000     8  READ(1,10,END=99)KHHN,KPN
9.000     10  FORMAT(2I5)
10.000 X   WRITE(6,11)KHHN,KPN
11.000     11  FORMAT(1X,'KHHN=',I5,2X,'KPN=',I5)
12.000     12  READ(5,15,END=99)IHHN
13.000     15  FORMAT(75X,I3)
15.000     120  FORMAT(1X,'IHHN=',I5)
15.100     READ(5,13)(IP(I),I=1,8)
15.200     13  FORMAT(1X,8(I1,8X))
15.300     ITP=0
15.400     DO 28 I=1,8
15.500     IF(IP(I).EQ.0)GO TO 28
15.600     ITP=ITP+1
15.700     28  CONTINUE
15.800     ITP=ITP-1
16.000     IF(KHHN.EQ.IHHN)GO TO 18
17.000     16  READ(5,17)NTYPE,(A(I),I=1,79)
18.000     17  FORMAT(I1,79A1)
19.000     IF(NTYPE .NE. 4)GO TO 16
20.000     GO TO 12
21.000 C
22.000 C
23.000 C   HOUSEHOLD TEST COMPLETED
24.000 C
25.000 C
26.000 C   READ TRAVEL INFO FOR ALL HOUSEHOLD MEMBERS EXCEPT
27.000 C   INDIVIDUAL UNDER ANALYSIS
28.000 C
28.500 X   WRITE(6,120)IHHN
29.000     18  K=0
30.000     I=0
31.000     4  K=K+1
32.000     J=K
33.000     19  I=I+1
34.000     NN(K)=I
35.000     READ(5,20)NTYPE,HH(K,I),TS(K,I),TA(K,I),PN(K,I)
36.000     20  FORMAT(I1,2X,I2,12X,2F4.2,36X,I1)
37.000 X   WRITE(6,22)NTYPE,HH(K,I),TS(K,I),TA(K,I),PN(K,I)
38.000     22  FORMAT(2X,I1,2X,I2,2X,F5.2,2X,F5.2,2X,I2)
39.000     IF(NTYPE .EQ. 4)GO TO 50
40.000     IF(I.EQ.1)GO TO 19
41.000     IF(PN(K,I) .EQ. PN(K,I-1))GO TO 19
42.000     IF(PN(K,I-1) .EQ. KPN)GO TO 21
43.000     J=K+1
44.000     HH(J,1)=HH(K,I)
45.000     TS(J,1)=TS(K,I)
46.000     TA(J,1)=TA(K,I)
47.000     PN(J,1)=PN(K,I)
48.000     NN(K)=I-1
```

```

51.000      I=1
52.000      GO TO 4
53.000    21  HH(J,1)=HH(K,I)
54.000      TS(J,1)=TS(K,I)
55.000      TA(J,1)=TA(K,I)
56.000      FN(J,1)=FN(K,I)
57.000      I=1
58.000      NN(K)=I
59.000  X    WRITE(6,121)K,I,HH(J,1),TS(J,1),TA(J,1),FN(J,1),NN(K)
60.000      GO TO 19
61.000    50  IF(FN(K,I-1).NE,KFN)GO TO 55
62.000      K=K-1
63.000      GO TO 56
64.000    55  NN(K)=I-1
65.000  C
66.000  C    CONSTRUCT HOME DEPARTURE AND ARRIVAL TABLE FOR ALL MEMBERS
67.000  C
68.000    56  DO 24 L=1,K
69.000      TLH(L,1)=TS(L,1)
70.000    24  CONTINUE
71.000  X    WRITE(6,125)K
72.000    125  FORMAT(1X,'K=',I3)
73.000      DO 39 L=1,K
74.000        M=0
75.000        MM(L)=0
76.000        DO 38 J=1,NN(L)
77.000  X    WRITE(6,126)L,J
78.000    126  FORMAT(1X,'L=',I3,2X,'J=',I3)
79.000        IF(HH(L,J).NE.16)GO TO 38
80.000        M=M+1
81.000        TAH(L,M)=TA(L,J)
82.000        MM(L)=MM(L)+1
83.000  X    WRITE(6,127)M,L,MM(L)
84.000    127  FORMAT(1X,'M=',I3,2X,'MM(',I2,')=' ,I3)
85.000        IF(J.EQ.NN(L))GO TO 38
86.000        TLH(L,M+1)=TS(L,J+1)
87.000    38  CONTINUE
88.000  X    WRITE(6,128)L,NN(L)
89.000    128  FORMAT(1X,'NN(',I2,')=' ,I2)
90.000    39  CONTINUE
91.000      DO 80 L=1,K
92.000        DO 80 J=1,MM(L)
93.000  X    WRITE(6,123)TLH(L,J),TAH(L,J)
94.000    123  FORMAT(2F7.2)
95.000    80  CONTINUE
96.000      DO 42 L=1,K
97.000        JJ(L)=MM(L)
97.500  X    WRITE(6,140)L,JJ(L)
97.600    140  FORMAT(1X,'JJ(',I3,')=' ,I3)
98.000    42  CONTINUE
99.000      IF(K.GT.1)GO TO 43
100.000     L=K
101.000     MX=JJ(L)
101.500  X    WRITE(6,149)MX
101.600    149  FORMAT(1X,'MX=' ,I3)
102.000     GO TO 7
103.000  C
104.000  C    INSERT 99'S IN HOME D/A TABLE TO ENSURE AN EQUAL NUMBER
105.000  C    OF DEPARTURES AND ARRIVALS ACROSS ALL HOUSEHOLD MEMBERS
106.000  C
107.000    43  DO 44 L=2,K
108.000      IF(JJ(L).LT.JJ(L-1))JJ(L)=JJ(L-1)
109.000    44  CONTINUE
110.000     MX=JJ(K)
110.500  X    WRITE(6,149)MX

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```

112.000      IF (MM(L),EQ,MAX)GO TO 48
113.000      DO 49 J=MM(L)+1,MX
114.000      TLH(L,J)=99.0
115.000      TAH(L,J)=99.0
116.000      49 CONTINUE
117.000      48 CONTINUE
118.000      7 DO 82 L=1,K
119.000      DO 82 J=1,MX
120.000 X     WRITE(6,123)TLH(L,J),TAH(L,J)
121.000      82 CONTINUE
122.000 C
123.000 C     DETERMINE THE TIMES WHEN THE NUMBER OF PEOPLE AT HOME
124.000 C     CHANGES AND ADJUST THE HOUSEHOLD SIZE ACCORDINGLY
125.000 C
126.000      DO 52 J=1,MX
127.000      DO 52 L=1,K
128.000      TL(J,L)=TLH(L,J)
129.000      TR(J,L)=TAH(L,J)
129.500 X     WRITE(6,150)J,L,TL(J,L),J,L,TR(J,L)
129.600 150   FORMAT(1X,'TL(',2I3,')='',F5.2,3X,'TR(',2I3,')='',F5.2)
130.000      52 CONTINUE
131.000      J=1
131.500      NP=J
131.750      DO 66 N=1,K
132.000      JN(N)=1
132.500      LN(N)=1
132.750 66    CONTINUE
133.000      NLN=1
134.000      IHHSIZE(1)=K
135.000      T(1)=0.00
136.000 X     WRITE(6,129)IHHSIZE(1),T(1)
137.000 129   FORMAT(1X,'IHHSIZE(1)='',I3,2X,'T(1)='',F5.2)
138.000      53 TLMIN(1)=99.0
139.000      TRMIN(1)=99.0
141.000 X     WRITE(6,125)K
142.000      DO 54 L=1,K
143.000 X     WRITE(6,132)NLN,TLMIN(L),TL(J,L),TRMIN(L),TR(J,L)
144.000 132   FORMAT(1X,'NLN=',I3,2X,4(F5.2,2X))
146.000      TLMIN(L+1)=AMIN1(TLMIN(L),TL(J,L))
147.000      TRMIN(L+1)=AMIN1(TRMIN(L),TR(J,L))
148.000 X     WRITE(6,130)NLN,TLMIN(L+1),TRMIN(L+1)
149.000 130   FORMAT(1X,'NLN=',I3,2X,'TLMIN='',F5.2,2X,'TRMIN='',F5.2)
150.000 X     WRITE(6,138)L
151.000 138   FORMAT(1X,'L=',I3)
152.000      54 CONTINUE
153.000      IF (TLMIN(K+1).NE,TRMIN(K+1))GO TO 57
154.000      DO 62 N=1,K
155.000      IF (TL(J,N).NE,TLMIN(K+1))GO TO 62
156.000      IF (JN(N).LT,MX)GO TO 34
157.000      TL(J,N)=99.0
158.000      GO TO 62
158.500 34    JN(N)=JN(N)+1
159.000      TL(J,N)=TL(JN(N),N)
160.000      62 CONTINUE
161.000      DO 63 N=1,K
162.000      IF (TR(J,N).NE,TRMIN(K+1))GO TO 63
163.000      IF (LN(N).LT,MX)GO TO 35
164.000      TL(J,N)=99.0
165.000      GO TO 63
165.500 35    LN(N)=LN(N)+1
166.000      TR(J,N)=TR(LN(N),N)
167.000      63 CONTINUE
168.000      IF (TLMIN(K+1).EQ,99.0 .AND. TRMIN(K+1).EQ,99.0)GO TO 64
169.000      GO TO 53
170.000      57 TMIN(K+1)=AMIN1(TLMIN(K+1),TRMIN(K+1))

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171.000 X WRITE(6,135)TMIN(K+1),TLMIN(K+1),TRMIN(K+1)
172.000 135 FORMAT(1X,'TMIN=',F5.2,2X,'TLMIN=',F5.2,2X,'TRMIN=',F5.2)
173.000 IF(TMIN(K+1).EQ.TLMIN(K+1))GO TO 59
174.000 KIJ=0
175.000 NLN=NLN+1
177.000 DO 58 N=1,K
178.000 IF(TR(NP,N).NE.TRMIN(K+1))GO TO 58
179.000 T(NLN)=TR(NP,N)
179.500 KIJ=KIJ+1
180.000 IF(LN(N).LT.MX)GO TO 33
181.000 TR(NP,N)=99.0
182.000 GO TO 58
182.500 33 LN(N)=LN(N)+1
183.000 TR(J,N)=TR(LN(N),N)
184.000 58 CONTINUE
184.100 X WRITE(6,144)KIJ
184.600 IHHSIZE(NLN)=IHHSIZE(NLN-1)+KIJ
184.700 X WRITE(6,136)NLN,IHHSIZE(NLN)
184.800 136 FORMAT(1X,'IHHSIZE(',I3,')=',I3)
185.000 IF(TRMIN(K+1).NE.99.0)GO TO 53
186.000 GO TO 69
188.000 59 KIJ=0
188.500 NLN=NLN+1
189.000 DO 60 N=1,K
190.000 IF(TL(NP,N).NE.TLMIN(K+1))GO TO 60
191.000 T(NLN)=TL(NP,N)
191.500 KIJ=KIJ+1
192.000 IF(JN(N).LT.MX)GO TO 36
193.000 TL(NP,N)=99.0
194.000 GO TO 60
194.500 36 JN(N)=JN(N)+1
195.000 TL(J,N)=TL(JN(N),N)
196.000 60 CONTINUE
196.100 X WRITE(6,144)KIJ
196.200 144 FORMAT(1X,'KIJ=',I3)
196.500 IHHSIZE(NLN)=IHHSIZE(NLN-1)-KIJ
196.600 X WRITE(6,136)NLN,IHHSIZE(NLN)
197.000 69 IF(TLMIN(K+1).NE.99.0)GO TO 53
197.100 64 IF(ITP.EQ.IHHSIZE(1))GO TO 81
197.200 INCR=ITP-IHHSIZE(1)
197.300 DO 87 KN=1,NLN
197.400 IHHSIZE(KN)=IHHSIZE(KN)+INCR
197.500 87 CONTINUE
198.000 81 DO 88 KN=1,NLN
199.000 WRITE(6,110)IHHN,T(KN),IHHSIZE(KN),ITP
200.000 110 FORMAT(15,2X,F7.2,2X,15,2X,I3)
201.000 68 CONTINUE
201.500 WRITE(6,180)ITP
201.600 180 FORMAT(1X,'9999',18X,I3)
202.000 GO TO 8
203.000 99 WRITE(6,115)
204.000 115 FORMAT(2X,'END OF FILE')
205.000 RETURN
206.000 END

```

1.000 C SNOOPER - DRIVER PROGRAM - VERSION D (WINDHAM)

2.000 C

3.000 C

4.000 C

5.000 C CHAINING BEHAVIOR IN URBAN TRIP MAKING

6.000 C

7.000 C C H A I N S

8.000 C

9.000 C Complex Household Activity Interaction Simulator

10.000 C

11.000 C Module # 2 -- SNOOPER

12.000 C (Version SNOOP:D Sept.1,1982)

13.000 C

14.000 C Specification of Feasible Activity Patterns

15.000 C

16.000 C W.W.RECKER M.G.MCNALLY G.S.ROOT

17.000 C

17.100 C Department of Civil Engineering and

17.200 C Institute of Transportation Studies

17.300 C University of California, Irvine

17.400 C

18.000 C PROGRAMMED BY: M.G.MCNALLY AND W.W.RECKER (9/81)

19.000 C MODIFIED BY: M.G.MCNALLY B(11/81) C(5/82) D(9/82)

20.000 C

21.000 C

22.000 DIMENSION NUMBER(6,6),NFACTOR(6),MODSEQ2(6)

23.000 COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),

24.000 * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)

25.000 COMMON/COUP/IC(6,6)

26.000 COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)

27.000 COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)

28.000 COMMON/SLOP/RNG(12),IRNG(12),DZ(12)

29.000 COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,0(10,500)

30.000 COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)

31.000 * ,NTOUR,KHHN,KPN,IGLOD,START,END,NDIS,KZ,MA,MAD(3,10)

32.000 COMMON/COORD/XL(12),YL(12)

33.000 COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KEY2(10),K0,K1,K2,K3,K4

34.000 COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOC(12),IBAY(12)

35.000 DIMENSION TITLE(18),ALPH(2),KX(750),KY(750)

36.000 INTEGER H,HH

37.000 DATA ((NUMBER(I,J),J=1,6),I=1,6)/6*0,1,1,4*0,1,2,1,3*0,

38.000 * 1,3,3,1,2*0,1,4,6,4,1,0,1,5,10,10,5,1/,

39.000 * (NFACTOR(I),I=1,6)/1,2,6,24,120,720/,

40.000 * (MODSEQ2(NTOUR),NTOUR=1,6)/2,4,8,16,32,64/

41.000 DATA ALPH/4HGRID,4HZONE/

42.000 EXTERNAL RANDOM

43.000 C

44.000 C FILE SETS:

45.000 C INPUT: F:1 - PARAMETERS (PARSNOOP)

46.000 C F:2 - 2 SEQUENCES (COMB2)

47.000 C F:3 - 3 SEQUENCES (COMB3)

48.000 C F:4 - 4 SEQUENCES (COMB4)

49.000 C F:5 - 5 SEQUENCES (COMB5)

50.000 C F:6 - 6 SEQUENCES (COMB6)

51.000 C F:7 - 1 TOUR/MODE (NCM1)

52.000 C F:8 - 2 TOUR/MODE (NCM2)

53.000 C F:9 - 3 TOUR/MODE (NCM3)

54.000 C F:10 - 4 TOUR/MODE (NCM4)

55.000 C F:11 - 5 TOUR/MODE (NCM5)

56.000 C F:12 - 6 TOUR/MODE (NCM6)

57.000 C F:13 - ACTIVITY PROGRAMS ()

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126.000 C -----
127.000 READ(1,905)(TITLE(I),I=1,18)
128.000 905 FORMAT(18A4)
129.000 WRITE(108,810)(TITLE(I),I=1,18)
130.000 810 FORMAT(/2X,19(4H----)/4X,18A4/2X,19(4H----))
131.000 READ(1,906)NOBS,KZ,NDIS,MA,NARB,NSMPL,DT,(V(I),I=1,5)
132.000 906 FORMAT(6I5,6F6.2)
133.000 IF(DT.EQ.0.0)DT=0.25
134.000 IF(NARB.EQ.0)NARB=99
135.000 C (RANDOM SELECTION UNNECESSARY FOR 3 OR LESS ACTIVITIES)
136.000 IF(NARB.LE.3)NARB=4
137.000 V(1)=V(1)+0.001
138.000 KB=V(1)
139.000 READ(1,907)K0,K1,K2,K3,K4
140.000 907 FORMAT(10I5)
141.000 READ(1,908)(FMT1(I),I=1,20),(FMT2(I),I=1,20),(FMT3(I),I=1,20),
142.000 , (FMT4(I),I=1,20)
143.000 908 FORMAT(20A4/20A4/20A4/20A4)
144.000 IF(K0.EQ.0)GO TO 910
145.000 READ(1,907)(KEY(I),I=1,10)
146.000 READ(1,907)(KOBJ(I),I=1,10)
147.000 C
148.000 NOBJ=0
149.000 DO 909 I=1,10
150.000 909 NOBJ=NOBJ+KEY(I)
151.000 C
152.000 C WRITE DATA OUTPUT INFORMATION
153.000 C -----
154.000 910 WRITE(108,815)
155.000 815 FORMAT(/2X,'FILE OUTPUT:'/7X,'FEASOUT - FEASIBLE ',
156.000 *'PATTERN DATA')
157.000 IF(K0.NE.0) WRITE(108,816)
158.000 816 FORMAT(7X,'OBJOUT - MULTI-OBJECTIVE CRITERIA VALUES'//)
159.000 C
160.000 C PRINT ANALYSIS PARAMETERS
161.000 C -----
162.000 KK=1
163.000 IF(KZ.EQ.0.0)KK=2
164.000 WRITE(108,830)
165.000 830 FORMAT(///16X,10(4H----)/16X,'GENERATION OF FEASIBLE',
166.000 , 'ACTIVITY PATTERNS'/16X,10(4H----)/)
167.000 WRITE(108,835)NOBS,ALPH(KK),NDIS,MA,D1,KV
168.000 835 FORMAT(16X,'NUMBER OF INDIVIDUALS ANALYZED. . . ',I3/
169.000 , 16X,'SPATIAL DISAGGREGATION. . . . . ',A4/
170.000 , 16X,'TIME/DISTANCE INPUT FILE. . . . . ',I3/
171.000 , 16X,'NUMBER OF SIMULATED MODES . . . . . ',I3/
172.000 , 16X,'BASIC TIME SIMULATION UNIT. . . . . 0',F4.3/
173.000 , 16X,'RECIPROCAL OF HOME INSERT'/
174.000 , 16X,' RANGE SEGMENTATION FACTOR. . . . . ',I3//)
175.000 IF(NARB.NE.99)WRITE(108,840)NARB,NSMPL
176.000 840 FORMAT(16X,'RANDOM SELECTION OF SEQUENCES'/
177.000 , 16X,' OCCURS FOR ACTIVITY PROGRAM SIZE . . ',I3/
178.000 , 16X,'SEQUENCE SAMPLING RATE (PERCENT). . . ',I3//)
179.000 C*****
180.000 C-----
181.000 C * PROGRAM ELEMENTS:
182.000 C -----
183.000 C
184.000 C THE SNOOPER MODULE MAY BE SUBDIVIDED INTO SIX ELEMENTS.
185.000 C EACH ELEMENT IS EXECUTED FOR EACH INDIVIDUAL IN THE CHOICE
186.000 C HOUSEHOLD, AS CONTROLLED BY THE GRAND LOOP. THE SEQUENTIAL
187.000 C ELEMENTS ARE INDICATED AS THEY ARE ACCESSED BY THE MAIN
188.000 C SNOOPER ROUTINE.
189.000 C
190.000 C-----

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60.000 C OUTPUT: F:15 - FEASIBLE
61.000 C PATTERN DATA (FEASOUT) 11
62.000 C F:16 - FEASIBLE
63.000 C OBJECTIVE VALUES (OBJOUT)
64.000 C

65.000 C -----
66.000 C PARAMETERS:
67.000 C TITLE - ALPHANUMERIC TITLE FOR PROGRAM
68.000 C NOBS - NUMBER OF INDIVIDUAL OBSERVATIONS
69.000 C (USUALLY THE NUMBER OF HOUSEHOLD MEMBERS)
70.000 C KZ - GRID SYSTEM(KZ=1) OR ZONES(KZ=0)
71.000 C NDIS - LOGICAL FILE INPUT FOR ADD ARRAY(DIS/TT)
72.000 C (F:13 or F:14 SUGGESTED)
73.000 C MA - NUMBER OF MODES AVAILABLE
74.000 C NARB - RANDOM SELECTION OF SEQUENCES FOR ACTIVITY
75.000 C PROGRAMS OF SIZE 'NARB' OR GREATER (MIN=4)
76.000 C NSMPL - SEQUENCE SAMPLING RATE (PERCENT)
77.000 C DT - BASIC TIME ANALYSIS INCREMENT(0.25 DEFAULT)
78.000 C V(1) - ALTERNATE TIME INCREMENT PARAMETER
79.000 C (RECIPROCAL OF THE HOME INSERT RANGE
80.000 C SEGMENTATION FACTOR)
81.000 C V(2) - SET TO 1.0 FOR ONLY INITIAL SEQUENCE BIAS
82.000 C
83.000 C K0 = 1 COMPUTE OBJECTIVE VALUES (0=DON'T)
84.000 C K1 = 1 PRINTED OUTPUT OF FEASIBLE PATTERNS (0=NONE)
85.000 C K2 = 1 PRINTED OUTPUT OF OBJECTIVE VALUES (0=NONE)
86.000 C K3 = 1 OUTPUT INPUT DATA ARRAYS (0=DON'T)
87.000 C K4 = 1 TRAVEL TIME INPUT IN MINUTES
88.000 C 0 MILITARY DECIMAL (DEFAULT)
89.000 C
90.000 C FMT1(I) = I/O FORMAT FOR INDIVIDUAL PARAMETER VECTOR
91.000 C FMT2(I) = I/O FORMAT FOR ACTIVITY PROGRAM ARRAY
92.000 C FMT3(I) = INPUT FORMAT FOR ACTIVITY ZONES
93.000 C FMT4(I) = INPUT FORMAT FOR TRAVEL TIME BETWEEN ZONES
94.000 C
95.000 C OBJECTIVE PARAMETERS (OPTIONAL)
96.000 C KEY(I) = 1 FOR COMPUTATION OF Ith OBJECTIVE
97.000 C KOBJ(I) = 1 FOR MAXIMIZATION, 0 FOR MINIMIZATION
98.000 C NOBJ = TOTAL NUMBER OF SELECTED OBJECTIVES
99.000 C -----

100.000 C
101.000 C PRODUCE OUTPUT HEADER
102.000 C -----
103.000 WRITE(108,799)
104.000 799 FORMAT(1H1///)
105.000 WRITE(108,800)
106.000 800 FORMAT(
107.000 .12X,52H***** SNOOPER ******/
108.000 .12X,52H* */
109.000 .12X,52H* CHAINING BEHAVIOR IN URBAN TRIP MAKING */
110.000 .12X,52H* */
111.000 .12X,52H* C H A I N S */
112.000 .12X,52H* */
113.000 .12X,52H* Complex Household Activity Interaction Simulator */
114.000 .12X,52H* */
115.000 .12X,52H* Module # 2 -- SNOOPER */
116.000 .12X,52H* (Version SNOOP:ID Sept.1,1982) */
117.000 .12X,52H* */
118.000 .12X,52H* Specification of Feasible Activity Patterns */
119.000 .12X,52H* */
120.000 .12X,52H* W.W.RECKER M.G.MCNALLY G.S.ROOT */
121.000 .12X,52H* */
122.000 .12X,52H***** SNOOPER *****)
123.000 C
124.000 C


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258.000      IF(KX(I),GT,KX(K)) KB=KB+1
259.000      20 CONTINUE
260.000      25 KY(KB)=KX(I)
261.000 C
262.000      28 KB=0
263.000      NS=MAX0(NS,KB)
264.000      JJ=J-1
265.000      WRITE(108,850)NS,NO,JJ
266.000      850 FORMAT('/ *** RANDOM SEQUENCE SELECTION ***'/
267.000      , 5X,1HC,I5,4H OF ,I5,' POSSIBLE SEQUENCES FOR',I2,
268.000      , ' INSERT(S) J'/)
269.000 C
270.000 C      (B). LOOP FOR NUMBER OF SEQUENCES PER INSERT NUMBER
271.000 C      -----
272.000      30 DO 50 K=1,NS
273.000      IF(NFILE.LT,NARB) GO TO 35
274.000 C
275.000      KK=KY(K)-KB-1
276.000      KB=KY(K)
277.000      IF(KK.EQ.0) GO TO 35
278.000 C      * (ELIMINATE SEQUENCES NOT SELECTED)
279.000      DO 33 I=1,KB
280.000      33 READ(NFILE,950)
281.000      950 FORMAT(1X)
282.000 C      -----
283.000 C      PRODUCE A(I,J) AND D(I,J) FOR EACH SEQUENCE AND
284.000 C      CALL SR COUPLER TO TEST FOR ACTIVITY COUPLING
285.000 C      CONSTRAINT VIOLATION -- IF VIOLATED, CONTROL
286.000 C      TRANSFERRED TO STATEMENT 50.
287.000 C      -----
288.000      35 CALL ORDER(&50)
289.000 C
290.000 C      CONVERT STANDARD DATA ARRAY INTO DATA VECTORS
291.000 C      -----
292.000 C      CALL SWITCHR
293.000 C
294.000 C      * ELEMENT # 3 - MODAL COMBINATORICS
295.000 C      -----
296.000 C      NCM=MODSEQ2(NTOUR)
297.000 C
298.000 C      SINGLE MODE ASSIGNMENT
299.000 C      -----
300.000 C      (SINGLE MODE SIMULATION REQUIRES ONLY A SINGLE
301.000 C      EXECUTION OF THE <DO 40> LOOP)
302.000 C      IF(MA.EQ.1)NCM=1
303.000 C      DO 40 KM=1,NCM
304.000 C      * (INSERT MODE FOR EACH ACTIVITY IN A TOUR)
305.000 C      CALL TRUCKER
306.000 C
307.000 C      * ELEMENT # 4 - SCHEDULE FEASIBILITY
308.000 C      -----
309.000 C
310.000 C      CALCULATE ACTIVITY TIMING CONSTRAINTS AND
311.000 C      IDENTIFY FEASIBLE ACTIVITY PATTERNS
312.000 C
313.000 C      CALL SOONER
314.000 C      CALL LATER
315.000 C      CALL SCREENER
316.000 C      IF(KFEAS.EQ.0) GO TO 40
317.000 C
318.000 C      * ELEMENT # 5 - ACTIVITY SCHEDULING
319.000 C      -----
320.000 C      CALL RANGER
321.000 C      CALL PITTER

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-----
193.000 C
194.000 C
195.000 IX=1
196.000 DO 1000 IOBS=1,NOBS
197.000 ITRACK=0
198.000 NTRACK=0
199.000 C
200.000 C * ELEMENT # 1 - INTEGRATION OF THE ACTIVITY PROGRAM
201.000 C -----
202.000 CALL GREETER
203.000 C (SR GREETER CALLS SR MEETER - AUGMENTED DISTANCE MATRIX)
204.000 C
205.000 C IF NFILE = 1, TRANSFER TO NEW INDIVIDUAL (TEMP.)
206.000 IF(NFILE.LE.1) GO TO 1000
207.000 N=NFILE
208.000 C
209.000 C * ELEMENT # 2 - ACTIVITY COMBINATORICS
210.000 C -----
211.000 C
212.000 C (A), LOOP FOR POSSIBLE HOME INSERTS [0 - (NFILE-1)]
213.000 C -----
214.000 DO 100 J=1,NFILE
215.000 NO=NFACTOR(NFILE)*NUMBER(NFILE,J)
216.000 NS=NO
217.000 IF(NFILE.LT.NARB) GO TO 30
218.000 C
219.000 C RANDOM SELECTION OF ACTIVITY SEQUENCES
220.000 C -----
221.000 C A TWO STAGE SAMPLING SCHEME IS UTILIZED TO DRAW A
222.000 C SAMPLE (NS) FROM THE SET OF POSSIBLE SEQUENCES(NO)
223.000 C THE FIRST STAGE SPECIFIES A BIASED SUB-SAMPLE (KK)
224.000 C WHICH INSURES THAT ORIGINAL ORDERED SEQUENCES ARE
225.000 C INCLUDED IN THE SAMPLE. IF THE BIASED SUB-SAMPLE
226.000 C IS LESS THAN THE DESIRED SAMPLE, A SECOND STAGE
227.000 C RANDOM SELECTION PROCESS IS INITIATED TO COMPLETE
228.000 C THE SAMPLE.
229.000 C
230.000 NS=NS*NSMPL/100
231.000 RNO=NO
232.000 C * (BIASED SELECTION - ALL ORIGINAL ORDER SEQUENCES)
233.000 KK=NUMBER(NFILE,J)
234.000 C * (RESET IF ONLY FIRST SEQUENCE BIAS DESIRED)
235.000 IF(V(2).EQ.1.0)KK=1
236.000 DO 8 I=1,KK
237.000 8 KY(I)=I
238.000 KX(KK)=0
239.000 C * [IF BIASED SELECTION (KK) EXCEEDS SAMPLE (NS), RESET
240.000 C SAMPLE AND RUN DIRECTLY ON PREORDERED KY(I) ARRAY]
241.000 IF(KK.GE.NS) GO TO 28
242.000 C
243.000 C * (RANDOM SAMPLE OF REMAINING SEQUENCE NUMBERS)
244.000 C (SELECT FROM (RNO-KK) REMAINING SEQUENCES)
245.000 DO 15 I=KK+1,NS
246.000 10 CALL RANDOM(IX,RX)
247.000 KX(I)=RX*((RNO-KK)-1.0) + 1.0 + KK
248.000 C WRITE(108,2000)I,KX(I),RX
249.000 C2000 FORMAT(' I=',I3,' KX(I)=',I4,' RX=',F10.7)
250.000 DO 15 K=KK+1,I
251.000 IF(KX(I).EQ.KX(K-1))GO TO 10
252.000 15 CONTINUE
253.000 C
254.000 C * (PLACE SELECTED SEQUENCES IN ORDER) **F5-77**
255.000 DO 25 I=KK+1,NS
256.000 KB=KK+1

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-----
324.000 C -----
325.000 C WHICH ITERATIVELY CALLS SR PATTERN, WHICH IN TURN
326.000 C ACCESSES SR CRITER (OPTIONALLY) FOR COMPUTATION
327.000 C OF MULTI-OBJECTIVE VALUES, AND SR SPITTER, WHICH
328.000 C OUTPUTS THE ACTUAL FEASIBLE PATTERN SET
329.000 C -----
330.000 40 CONTINUE
331.000 C END MODAL LOOP.
332.000 45 NT=NTOUR+6
333.000 REWIND(NT)
334.000 50 CONTINUE
335.000 C END SEQUENCE LOOP.
336.000 N=N+1
337.000 IF(NFILE.LT.NARB) GO TO 100
338.000 C
339.000 C * (OUTPUT RANDOM SELECTION SUMMARY)
340.000 KK=ITRACK-NTRACK
341.000 NTRACK=ITRACK
342.000 WRITE(108,855)NS,KK
343.000 855 FORMAT(5X,1HC,15,28H PATTERNS PROCESSED YIELDING
344.000 ,15,22H FEASIBLE PATTERN(S) I/)
345.000 C * (ELIMINATE SEQUENCES NOT SELECTED)
346.000 KK=NO-KB-1
347.000 IF(KK.LE.0) GO TO 100
348.000 DO 63 I=1,KK
349.000 63 READ(NFILE,950)
350.000 C
351.000 100 CONTINUE
352.000 C END INSERT LOOP.
353.000 C -----
354.000 C*****
355.000 C FINAL PROGRAM OUTPUT:
356.000 C -----
357.000 C FEASIBLE PATTERNS (FILE 'FEASOUT' AND PRINTER OPTION)
358.000 C ARE OUTPUT IN SR SPITTER (CALLED FROM SR PATTERN).
359.000 C MULTI-OBJECTIVE VALUES,IF COMPUTED, ALSO MAY BE
360.000 C OPTIONALLY OUTPUT TO PRINTER.
361.000 C -----
362.000 C
363.000 C OUTPUT TO F:15 KEY TO IDENTIFY END OF INDIVIDUAL
364.000 C -----
365.000 WRITE(15,818)
366.000 818 FORMAT(' 9999')
367.000 C
368.000 C OUTPUT PATTERN SET SUMMARY:
369.000 C -----
370.000 WRITE(108,819)
371.000 819 FORMAT(//1X,11(4H----))// SIMULATED FEASIBLE PATTERNS//
372.000 * 1X,11(4H----))
373.000 WRITE(108,820)KHHN,IOBS,KPN,ITRACK,NFILE
374.000 820 FORMAT(// HOUSEHOLD NUMBER',I10,5X,' IOBS ',15/
375.000 * ' INDIVIDUAL',15,' HAS',14,' FEASIBLE PATTERNS'/
376.000 *' (PROGRAM HAS',12,' PLANNED ACTIVITIES)'/1X,11(4H----)//)
377.000 C
378.000 C OUTPUT THE FILE ORJOUT:
379.000 C -----
380.000 IF(KO.EQ.0) GO TO 700
381.000 WRITE(16,FMT1)IOBS,KHHN,KPN,NFILE,IGLOO,START,END,ITRACK
382.000 WRITE(16,205)NOBJ,(KEY2(I),I=1,NOBJ)
383.000 205 FORMAT(15,6(17,5X)/(5X,6(17,5X)))
384.000 DO 150 K=1,ITRACK
385.000 150 WRITE(16,206)K,(O(J,K),J=1,NOBJ)
386.000 206 FORMAT(15,6E12,4/(5X,6E12,4))
387.000 C -----

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```

391,000 1000 CONTINUE
392,000 C
393,000 C
394,000 C*****
395,000 WRITE(108,810)(TITLE(I),I=1,18)
396,000 WRITE(108,1111)NOBS
397,000 1111 FORMAT(/5X,'EXECUTION TERMINATED NORMALLY AFTER',
398,000 * 14', INDIVIDUALS./)
399,000 STOP
400,000 END

```

```

1.000 SUBROUTINE GREETER
2.000 COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
3.000 * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
4.000 COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
5.000 COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KEY2(10),K0,K1,K2,K3,K4
6.000 COMMON/COUP/IC(6,6)
7.000 COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,D(10,500)
8.000 C-----
9.000 C INPUT:
10.000 C - INDIVIDUAL PARAMETER DATA (IPD) VECTOR,
11.000 C - ACTIVITY PROGRAM DATA (APD) ARRAY (ACT(I,J)),
12.000 C - MODAL AVAILABILITY DATA (MAD) ARRAY (MAD(I,J)),
13.000 C - COUPLING CONSTRAINT DATA (CCD) ARRAY (IC(I,J)),
14.000 C - COMPUTE IMPLIED COUPLING CONSTRAINTS, AND
15.000 C - CALL SR DISTMAT TO CONSTRUCT THE
16.000 C ACTIVITY-DISTANCE DATA (ADD) ARRAY (DIS(I,J))
17.000 C-----
18.000 C IPD VECTOR:
19.000 C KHHN - HOUSEHOLD NUMBER
20.000 C KPN - INDIVIDUAL NUMBER
21.000 C NFILE - NUMBER OF PLANNED ACTIVITIES
22.000 C IGLOO - HOME LOCATION
23.000 C START - START TIME OF INDIVIDUAL TRAVEL DAY
24.000 C END - END TIME OF TRAVEL DAY
25.000 C
26.000 C APD ARRAY:
27.000 C H(I) - UNIQUE ACTIVITY NUMBER
28.000 C TB(I) - EARLIEST UNCONDITIONAL START TIME
29.000 C TE(I) - LATEST UNCONDITIONAL ENDING TIME
30.000 C TD(I) - DESIRED ACTIVITY DURATION
31.000 C LOC(I) - ACTIVITY LOCATION
32.000 C HH(I) - ACTIVITY TYPE
33.000 C EAT(I) - MAXIMUM WAIT TIME BEFORE ACTIVITY
34.000 C BARF(I) - MAXIMUM WAIT TIME AFTER ACTIVITY
35.000 C IPI(I) - NO. OF ACCOMPANYING INDIVIDUALS (IN)
36.000 C IPD(I) - ... FROM OUTSIDE HOUSEHOLD
37.000 C IMP(I) - IMPORTANCE TO HOUSEHOLD
38.000 C IFREQ(I) - FREQUENCY OF OCCURANCE
39.000 C KNOW(I) - ADVANCED KNOWLEDGE (TIME)
40.000 C * ILOC(I) - ALTERNATE LOCATION POSSIBLE
41.000 C * IDAY(I) - ALTERNATE DAY POSSIBLE
42.000 C
43.000 C MAD ARRAY:
44.000 C MAD(I,J) - AVAILABILITY OF MODE 'I' (I=1,MA)
45.000 C DEFINED BY PAIRED TIMES 'J'
46.000 C (e.g. 8.50 12.50 18.00 24.00)
47.000 C
48.000 C CCD ARRAY:
49.000 C IC(I,J) - ACTIVITY COUPLING CONSTRAINTS
50.000 C (= 0 NO CONSTRAINT
51.000 C = 1 'J' MUST FOLLOW 'I'
52.000 C =-1 'I' MUST PRECEDE 'J'
53.000 C = 2 'I' MUST IMMEDIATELY FOLLOW 'J'
54.000 C =-2 'I' MUST IMMEDIATELY PRECEDE 'J')
55.000 C
56.000 C ADD ARRAY:
57.000 C DIS(I,J) - TRAVEL TIME (OR DISTANCE) BETWEEN THE
58.000 C PLANNED ACTIVITIES OF THE APD ARRAY AS
59.000 C WELL AS THE HOME LOCATION. (FIRST ROW
60.000 C AND COLUMN INDICATE ACTIVITY NUMBER)
61.000 C

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64.000 C      INITIALIZE DATA ARRAYS
65.000 C      -----
66.000      DO 15 I=1,12
67.000      DO 10 J=1,20
68.000      10 ACT(I,J)=0.
69.000      DO 15 J=1,12
70.000      15 DIS(I,J)=0.
71.000 C
72.000 C      INPUT INDIVIDUAL ACTIVITY PROGRAM
73.000 C      -----
74.000 C      * IPD VECTOR:
75.000      READ(13,FMT1,END=69)JUNK,KHHN,KPN,NFILE,IGLOO,START,END
76.000      WRITE(15,FMT1)IOBS,KHHN,KPN,NFILE,IGLOO,START,END
77.000      WRITE(108,200)KHHN,KPN,NFILE,IGLOO,START,END
78.000      200 FORMAT(1H1//1X,34(1H*)/
79.000      , ' * HOUSEHOLD ',15,16X,1H*/1X,34(1H*)/
80.000      , ' * INDIVIDUAL ',15,16X,1H*/ ' * PLANNED ACTIVITIES ',
81.000      , I7,4X,1H*/ ' * HOME LOCATION ',5X,I7,4X,1H*/
82.000      , ' * TRAVEL DAY START ',5X,F7.2,1X,1H*/
83.000      , ' * TRAVEL DAY END ',7X,F7.2,1X,1H*/1X,34(1H*)//)
84.000 C
85.000 C      * APD ARRAY:
86.000      DO 20 I=1,NFILE
87.000      20 READ(13,FMT2)(ACT(I,J),J=1,13)
88.000 C
89.000 C      * MAD ARRAY:
90.000      DO 25 I=1,MA
91.000      25 READ(13,101)(MAD(I,J),J=1,10)
92.000      101 FORMAT(10F7.2)
93.000 C
94.000 C      * CCD ARRAY
95.000      DO 30 I=1,NFILE
96.000      30 READ(13,102)(IC(I,J),J=1,NFILE)
97.000      102 FORMAT(6I2)
98.000 C
99.000 C      OPTIONAL OUTPUT OF INPUT DATA ARRAYS (K3=1)
100.000 C      -----
101.000      IF(K3.NE.1)GO TO 35
102.000      WRITE(108,210)
103.000      210 FORMAT(/3X,'ACTIVITY PROGRAM DATA ARRAY'/3X,27(1H-))
104.000      DO 32 I=1,NFILE
105.000      32 WRITE(108,FMT2)(ACT(I,J),J=1,13)
106.000 C      WRITE(108,220)
107.000 C      220 FORMAT(/3X,'AUTOMOBILE AVAILABILITY DATA'/3X,28(1H-))
108.000 C
109.000 C      COMPUTE IMPLIED COUPLING CONSTRAINTS
110.000 C      -----
111.000      35 DO 50 I=1,NFILE
112.000      DO 50 J=1,NFILE
113.000      IF(IC(I,J))50,40,50
114.000      40 X=ACT(J,3)-ACT(J,4)
115.000      Y=ACT(I,3)-ACT(I,4)
116.000      IF(ACT(I,2).GT.X) IC(I,J)=1
117.000      IF(Y.LT.ACT(J,2)) IC(I,J)=-1
118.000      50 CONTINUE
119.000 C
120.000 C      PRODUCE THE AUGMENTED DISTANCE MATRIX
121.000 C      -----
122.000      CALL MEETER
123.000 C
124.000 C      OPTIONAL OUTPUT OF CONSTRUCTED TRAVEL TIME ARRAY
125.000 C      -----
126.000      IF(K3.NE.1)GO TO 55
127.000      WRITE(108,250)

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-----  
130.000      NNN=NFILE+2  
131.000      ACT(NN,5)=IGL00  
132.000      WRITE(108,260)(ACT(I,5),I=1,NN)  
133.000 260  FORMAT(4X,4HZONE,9X,12(1X,F6.0))  
134.000      WRITE(108,265)(DIS(1,J),J=2,NNN)  
135.000 265  FORMAT(9X,8HACTIVITY,12(1X,F6.3))  
136.000      DO 52 I=2,NNN  
137.000      52  WRITE(108,270)ACT(I-1,5),(DIS(I,J),J=1,NNN)  
138.000 270  FORMAT(2X,F6.0,2X,12(1X,F6.3))  
139.000      WRITE(108,280)  
140.000 280  FORMAT(//)  
141.000 C  
142.000 C      ADJUST ACTIVITY TIMING CONSTRAINTS FOR INDIVIDUAL DAY  
143.000 C      -----  
144.000      55  DO 60 I=1,NFILE  
145.000          IF(ACT(I,2).LT.START) ACT(I,2)=START  
146.000          IF(ACT(I,3).GT.END) ACT(I,3)=END  
147.000      60  CONTINUE  
148.000          RETURN  
149.000 C-----  
150.000      69  WRITE(108,1010)  
151.000 1010  FORMAT(//39H  *** INPUT ERROR - EOF ON UNIT 13 ***//)  
152.000          STOP 1  
153.000 C-----  
154.000          END
```

```
1.000 SUBROUTINE MEETER
2.000 COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
3.000 * ,NTOUR,KHHN,KPN,IGL00,START,END,NDIS,KZ,MA,MAD(3,10)
4.000 COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
5.000 COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KEY2(10),K0,K1,K2,K3,K4
6.000 DIMENSION NL(10),TT(10,10),L(10)
7.000 C-----
8.000 C CONSTRUCT AUGMENTED DISTANCE/TIME MATRIX INCORPORATING
9.000 C ACTIVITY TYPE INTO FIRST COLUMN AND FIRST ROW (LAST
10.000 C ROW AND COLUMN IS PROPERLY ZEROED IN SR GREETER TO
11.000 C ACCOUNT FOR THE LAST COLUMN/ROW HOME ENTRY)
12.000 C-----
13.000 C
14.000 C INSERT LABELS FOR AUGMENTED MATRIX (BOTH OPTIONS)
15.000 NN=NFILE+1
16.000 DIS(1,1)=99.
17.000 DO 10 J=1,NN
18.000 DIS(1,J+1)=ACT(J,1)
19.000 10 DIS(J+1,1)=DIS(1,J+1)
20.000 C
21.000 C SELECT MATRIX OPTION:
22.000 C-----
23.000 C IF KZ = 0, INPUT FULL MATRIX (TIME) AND AUGMENT
24.000 C IF KZ = 1, USE DISTANCE-BASED GRID SYSTEM
25.000 C IF(KZ.EQ.0) GO TO 30
26.000 C
27.000 C-----
28.000 C CONSTRUCT UPPER DIAGONAL DISTANCE MATRIX, SETTING
29.000 C D(J,I) = D(I,J) USING A DISTANCE BASED GRID AND INPUT
30.000 C MODAL VELOCITIES [OPTION NOT FULLY IMPLEMENTED 9-1-81]
31.000 C-----
32.000 DO 20 I=1,NFILE
33.000 JJ=I+1
34.000 DO 20 J=JJ,NN
35.000 DIS(I+1,J+1)=SQRT((ACT(I,5)-ACT(J,5))**2
36.000 * + (ACT(I,6)-ACT(J,6))**2)
37.000 C IF(DIS(I,J).EQ.0.) DIS(I,J)=0.4
38.000 C EVENTUAL SUBSTITUTION OF INTRAZONAL TRAVEL DISTANCE
39.000 C FOR DIFFERENT ACTIVITIES WITH SAME COORDINATES
40.000 20 DIS(J+1,I+1)=DIS(I+1,J+1)
41.000 RETURN
42.000 C-----
43.000 C INPUT ZONAL DISTANCE MATRIX AND CONSTRUCT FULL
44.000 C ACTIVITY DISTANCE MATRIX (DIS)
45.000 C-----
46.000 30 READ(NDIS,FMT3)KHHNO,KPNO,KLOC,(NL(J),J=1,KLOC)
47.000 DO 40 I=1,KLOC
48.000 40 READ(NDIS,FMT4)(TT(I,J),J=1,KLOC)
49.000 C
50.000 IF(KHHNO.NE.KHHN) GO TO 1000
51.000 IF(KPNO.NE.KPN) GO TO 1010
52.000 C
53.000 IF(K4.NE.1)GO TO 42
54.000 DO 41 I=1,KLOC
55.000 DO 41 J=1,KLOC
56.000 IF(TT(I,J).EQ.0.0) TT(I,J)=1.0
57.000 41 TT(I,J)=TT(I,J)/60.0
58.000 C
59.000 42 ACT(NN,5)=IGL00
60.000 DO 50 I=1,NN
61.000 L(I)=0
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64.000 45 CONTINUE
65.000 50 L(I)=J
66.000 C
67.000 DO 60 I=1,NN
68.000 II=I+1
69.000 LC=L(I)
70.000 DO 60 J=I,NN
71.000 LR=L(J)
72.000 DIS(II,J+1)=TT(LR,LC)
73.000 60 DIS(J+1,II)=TT(LR,LC)
74.000 RETURN
75.000 C-----
76.000 1000 WRITE(108,1001)KHHNO
77.000 1001 FORMAT(//' *** INPUT ERROR ***',
78.000 , 'INCORRECT HOUSEHOLD ON DISTANCE FILE - HH=',I6)
79.000 STOP 2
80.000 1010 WRITE(108,1011)KHHNO,KPNO
81.000 1011 FORMAT(//' *** INPUT ERROR ***',
82.000 , 'INCORRECT PERSON NUMBER ',2I6)
83.000 STOP 3
84.000 C-----
85.000 END
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1.000      SUBROUTINE ORDER(*)
2.000      COMMON/COUP/IC(6,6)
3.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
4.000      * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
5.000      COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),
6.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
7.000      COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOC(12),JDAY(12)
8.000      DIMENSION IORD(12),DW(13,13)
9.000 C-----
10.000 C      FOR EACH POTENTIAL ACTIVITY PERMUTATION:
11.000 C          (1) READ THE ACTIVITY SEQUENCE
12.000 C          (2) ORDER A WORKING DATA ARRAY (A(I,J))
13.000 C          (3) TEST FOR COUPLING CONSTRAINTS (SR COUPLE)
14.000 C          (4) ADD THE TOUR VARIABLE - TOUR(I)
15.000 C          (5) REORDER A WORKING DISTANCE ARRAY(D(I,J))
16.000 C-----
17.000 C
18.000 C      *INITIALIZE WORKING ARRAYS
19.000 C      -----
20.000          DO 2 I=1,12
21.000              TOUR(I)=0.
22.000          DO 1 J=1,20
23.000      1  A(I,J)=0.
24.000          DO 2 J=1,12
25.000      2  D(I,J)=0.
26.000          DO 3 I=1,13
27.000          DO 3 J=1,13
28.000      3  DW(I,J)=0.
29.000          NN=NFILE+1
30.000 C
31.000 C      *READ ACTIVITY SEQUENCE FROM APPROPRIATE FILE
32.000 C      -----
33.000          READ(NFILE,500) (IORD(I),I=1,N)
34.000      500  FORMAT(12I1)
35.000 C
36.000 C      *ARRANGE ARRAY ACCOUNTING FOR INSERTED HOME TRIPS
37.000 C      -----
38.000          DO 30 I=1,N
39.000              IO=IORD(I)
40.000              IF(IO.NE.0) GO TO 10
41.000 C
42.000          A(I,1)=0.
43.000          A(I,2)=START
44.000          A(I,3)=END
45.000          A(I,4)=0.0
46.000          A(I,5)=IGLOO
47.000          A(I,6)=16.0
48.000          A(I,7)=0.0
49.000          A(I,8)=0.0
50.000          A(I,9)=0.0
51.000          A(I,10)=0.0
52.000          A(I,11)=0.0
53.000          A(I,12)=0.0
54.000          A(I,13)=0.0
55.000 C
56.000          GO TO 30
57.000      10  DO 20 J=1,20
58.000          20  A(I,J)=ACT(IO,J)
59.000          30  CONTINUE
60.000 C-----
61.000 C      *USING THE REARRANGED DATA ARRAY,
62.000 C      TEST THE NEW SEQUENCE FOR COUPLING CONSTRAINT

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64.000 C      TO MAIN PROGRAM FOR A NEW SEQUENCE
65.000 C-----
66.000      CALL COUPLE(&4)
67.000 C
68.000 C      *ADD THE TOUR VARIABLE TO THE SPECIFIED ACTIVITY SEQUENCE
69.000 C-----
70.000      NTOUR=0
71.000      DO 35 I=1,N-1
72.000      TOUR(I) = NTOUR+1
73.000      IF(A(I,6).EQ.16.0.AND.A(I+1,6).NE.16.0)NTOUR=NTOUR+1
74.000 35 CONTINUE
75.000      NTOUR=NTOUR+1
76.000      TOUR(N)=NTOUR
77.000 C
78.000 C      REARRANGE DISTANCE ARRAY TO MATCH NEW SEQUENCE
79.000 C-----
80.000      LL=N+1
81.000      LLL=N+2
82.000      IORD(LL)=0
83.000 C
84.000 C      INSERT ACTIVITY LABELS
85.000      DW(1,1)=99.
86.000      DO 40 J=1,LL
87.000      DW(1,J+1)=IORD(J)
88.000 40 DW(J+1,1)=IORD(J)
89.000 C
90.000 C      INSERT NEW DISTANCE VALUES
91.000      DO 60 I=1,LL
92.000      IO=IORD(I)
93.000      IF(IO.EQ.0) GO TO 60
94.000      DO 50 J=1,LL
95.000      JO=IORD(J)
96.000      IF(JO.NE.0)GO TO 51
97.000      DW(I+1,J+1)=DIS(IO+1,NN+1)
98.000      GO TO 50
99.000 51 DW(I+1,J+1)=DIS(IO+1,JO+1)
100.000 50 CONTINUE
101.000 60 CONTINUE
102.000 C-----
103.000 C      ALL NON-HOME ACTIVITY ROWS ARE FILLED, AND LAST COLUMN
104.000 C      (DW(I,LL),I=1,LL) IS COMPLETE (HOME-HOME ELEMENTS ARE
105.000 C      ZERO).TRANPOSE LAST COLUMN INTO EACH HOME ACTIVITY ROW
106.000 C-----
107.000      DO 80 I=1,LLL
108.000      IF(DW(I,1).NE.0.) GO TO 80
109.000      DO 70 J=1,LLL
110.000 70 DW(I,J)=DW(J,LLL)
111.000 80 CONTINUE
112.000      DO 110 I=1,LL
113.000      DO 110 J=1,LL
114.000 110 D(I,J)=DW(I+1,J+1)
115.000      RETURN
116.000 C-----
117.000 C      IF COUPLING CONSTRAINT VIOLATION IN SR COUPLE,
118.000 C      RETURN TO MAIN ROUTINE FOR NEW SEQUENCE INPUT
119.000 C-----
120.000      4 RETURN 1
121.000      END

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1.000      SUBROUTINE COUPLE(*)
2.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
3.000      * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
4.000      COMMON/COUP/IC(6,6)
5.000 C-----
6.000 C      TEST FOR ACTIVITY COUPLING CONSTRAINTS AND ELIMINATE
7.000 C      THOSE SEQUENCES IN VIOLATION, RETURNING TO SR ORDER (&4)
8.000 C-----
9.000      DO 2 I=1,NFILE
10.000     DO 2 J=1,I
11.000     IF(IC(I,J))3,2,3
12.000     3 DO 4 K=1,N
13.000     IF(A(K,1).EQ.I)IP=K
14.000     IF(A(K,1).EQ.J)JP=K
15.000     4 CONTINUE
16.000     IF(IC(I,J).LT.0) GO TO 5
17.000     IF(IP.GT.JP) GO TO 2
18.000     RETURN 1
19.000     5 IF(IP.LT.JP) GO TO 2
20.000     RETURN 1
21.000     2 CONTINUE
22.000     RETURN
23.000     END

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1.000      SUBROUTINE SWITCHR
2.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
3.000      * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
4.000      COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),
5.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
6.000      COMMON/COORD/XL(12),YL(12)
7.000      COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOC(12),IDAY(12)
8.000      INTEGER H,HH
9.000 C-----
10.000 C      SR TRANSFERS DATA FROM BASIC DATA ARRAY INTO
11.000 C      INDIVIDUAL DATA VECTORS
12.000 C-----
13.000     DO 10 I=1,N
14.000     H(I) =A(I,1)
15.000     TB(I)=A(I,2)
16.000     TE(I)=A(I,3)
17.000     TD(I)=A(I,4)
18.000     LOC(I)=A(I,5)
19.000 C     XL(I)=A(I,5)
20.000 C     YL(I)=A(I,6)
21.000     HH(I)=A(I,6)
22.000     EAT(I)=A(I,7)
23.000     BARF(I)=A(I,8)
24.000 C     (IPI AND IPO NOT IN COMMON YET)
25.000 C     IPI(I)=A(I,9)
26.000 C     IPO(I)=A(I,10)
27.000     IMP(I)=A(I,11)
28.000     IFREQ(I)=A(I,12)
29.000     KNOW(I)=A(I,13)
30.000 C     ILOC(I)=
31.000 C     IDAY(I)=
32.000     10 CONTINUE
33.000     RETURN
34.000     END

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E XTRUCKER
TY

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1.000      SUBROUTINE TRUCKER
2.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
3.000      * ,NTOUR,KHHN,KPN,IGLOD,START,END,NDIS,KZ,MA,MAD(3,10)
4.000      COMMON/CHAR/TS(12),TF(12),TD(12),TC(12),TE(12),H(12),
5.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
6.000      COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOC(12),IDAY(12)
7.000      COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KEY2(10),K0,K1,K2,K3,K4
8.000      INTEGER H,HH
9.000      DIMENSION MORD(6)
10.000     DATA MORD/6*1/
11.000 C-----
12.000 C      COMPUTE VARIABLE M(I) FROM TOUR VARIABLE BY
13.000 C      INSERTING A POTENTIAL MODE FOR EACH ACTIVITY
14.000 C      IN A TOUR FOR EVERY TOUR EXECUTED
15.000 C-----
16.000 C
17.000      IF(MA.EQ.1) GO TO 1
18.000 C
19.000 C      READ MODE SEQUENCE FROM APPROPRIATE FILE
20.000 C      -----
21.000      NT=NTOUR+6
22.000      READ(NT,500)(MORD(I),I=1,NTOUR)
23.000      500 FORMAT(6I1)
24.000 C
25.000      1 KT=1
26.000      DO 10 I=1,N
27.000      IF(TOUR(I).EQ.KT) GO TO 10
28.000      KT=KT+1
29.000      10 M(I)=MORD(KT)
30.000      RETURN
31.000      END
    
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E XSDONER
TY

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1.000      SUBROUTINE SOONER
2.000      INTEGER H,HH
3.000      COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),
4.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
5.000      COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)
6.000      COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
8.000      * ,NTOUR,KHHN,KPN,IGLOD,START,END,NDIS,KZ,MA,MAD(3,10)
9.000 C-----
10.000 C      *COMPUTE TES(I)
11.000 C      -----
12.000 C      COMPUTE THE EARLIEST CONDITIONAL STARTING TIME FOR
13.000 C      EACH ACTIVITY BY TAKING THE MAXIMUM OF:
14.000 C      (1) THE UNCONDITIONAL STARTING TIME, AND
15.000 C      (2) THE EARLIEST CONDITIONAL STARTING TIME BASED ON
16.000 C      TRAVEL TIME FROM THE PREVIOUS ACTIVITY (TAKING ITS
17.000 C      EARLIEST CONDITIONAL STARTING TIME AND DURATION
18.000 C      INTO CONSIDERATION)
19.000 C-----
20.000      TES(1)=TB(1)
21.000      DO 2 J=2,N
22.000      X=TB(J)
23.000      Y=TES(J-1)+D(J,J-1)+TD(J-1)
24.000      TES(J)=AMAX1(X,Y)
25.000      2 CONTINUE
26.000      RETURN
27.000      END
    
```

E XLATER
TY

```

1.000      SUBROUTINE LATER
2.000      INTEGER H,HH
3.000      COMMON/CHAR/TS(12),TF(12),TD(12),TR(12),TE(12),H(12),
4.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
5.000      COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)
6.000      COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
8.000      * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
9.000 C-----
10.000 C      *COMPUTE  TLS(I)
11.000 C      -----
12.000 C      COMPUTE THE LATEST CONDITIONAL STARTING TIME
13.000 C      FOR EACH ACTIVITY BY TAKING THE MINIMUM OF:
14.000 C      (1) THE LATEST ENDING TIME FOR AN ACTIVITY MINUS ITS
15.000 C      DURATION, AND,
16.000 C      (2) THE LATEST CONDITIONAL STARTING TIME OF THE
17.000 C      FOLLOWING ACTIVITY ADJUSTING FOR THE ORIGINAL
18.000 C      ACTIVITY'S DURATION AND TRAVEL TIME TO THE
19.000 C      FOLLOWING ACTIVITY (PROCEEDING FROM THE LAST
20.000 C      ACTIVITY TO THE FIRST)
21.000 C-----
22.000 C
23.000      TLS(N)=TE(N)-TD(N)
24.000      DO 2 K=1,N-1
25.000      J=N-K
26.000      X=TLS(J+1)-D(J+1,J)-TD(J)
27.000      Y=TE(J)-TD(J)
28.000      TLS(J)=AMIN1(X,Y)
29.000      2 CONTINUE
30.000      RETURN
31.000      END

```

E XSCREENER
TY

```

1.000      SUBROUTINE SCREENER
2.000      INTEGER H,HH
4.000      COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)
5.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
6.000      * ,NTOUR,KHHN,KPM,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
7.000 C-----
8.000 C      TEST FOR FEASIBLE SEQUENCES BY COMPARING THE EARLIEST
9.000 C      AND LATEST CONDITIONAL STARTING TIMES OF EACH ACTIVITY
10.000 C-----
11.000      KFEAS=1
12.000      DO 2 J=1,N
13.000      IF (TES(J).GT.TLS(J)+0.02) GO TO 3
14.000      2 CONTINUE
15.000      GO TO 4
16.000      3 KFEAS=0
17.000      4 RETURN
18.000      END

```

```

1.000      SUBROUTINE RANGER
2.000      INTEGER H,HH
3.000      COMMON/SLOP/RNG(12),IRNG(12),DZ(12)
4.000      COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),
5.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
6.000      COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)
7.000      COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
8.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
9.000      * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
10.000     COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOD(12),IDAY(12)
11.000 C-----
12.000 C      *COMPUTE IRNG(I)
13.000 C      -----
14.000 C      COMPUTE THE RANGE OF PATTERNS GENERATED FOR EACH SEQUENCE
15.000 C      BY VARYING THE DWELL TIME AT HOME FOR EACH HOME INSERT
16.000 C      ACTIVITY BY THE PARAMETER 'DZ(I)', THE RANGE IS BASED
17.000 C      ON THE RELATIVE DURATIONS USING THE LATEST AND EARLIEST
18.000 C      CONDITIONAL STARTING TIMES, AND PATTERNS ARE GENERATED
19.000 C      USING THE MAXIMUM OF THE BASE INCREMENT (DT) AND THAT
20.000 C      INCREMENT DZ(I) COMPUTED FROM DESIRED SUB-DIVISIONS BY
21.000 C      PARAMETER V(1) [e.g. V(1)=4.001 FOR QUARTILES]
22.000 C-----
23.000 C
24.000 C      INITIALIZE RANGE FOR THE FIRST ACTIVITY:
25.000 C      -----
26.000      RNG(1)=TLS(1)-TES(1)
27.000      DZ(1)=RNG(1)/V(1)
28.000      DZ(1)=AMAX1(DT,DZ(1))
29.000      IRNG(1)=RNG(1)/DZ(1)+1.0
30.000 C
31.000 C      COMPUTE FOR REMAINING ACTIVITIES:
32.000 C      -----
33.000      DO 30 J=2,N
34.000      IRNG(J)=1
35.000      RNG(J)=0.
36.000      DZ(J)=DT
37.000 C
38.000 C      COMPUTE DURATION AND RANGE FOR HOME INSERTS ONLY:
39.000 C      -----
40.000      IF(H(J).NE.0) GO TO 30
41.000 C      * (COMPUTE INSERT DURATION)
42.000      TD(J)=TES(J+1)-D(J+1,J)-EAT(J+1)-TES(J)
43.000      TD(J)=AMAX1(0.0,TD(J))
44.000 C      * (COMPUTE MAXIMUM DURATION)
45.000      10 RNG(J)=TLS(J+1)-D(J+1,J)-TD(J)-TES(J)
46.000      RNG(J)=AMAX1(0.0,RNG(J))
47.000 C      * (COMPUTE GENERATION PARAMETERS)
48.000      DZ(J)=RNG(J)/V(1)
49.000      DZ(J)=AMAX1(DT,DZ(J))
50.000 C      * (COMPUTE PATTERN GENERATION RANGE)
51.000      IRNG(J)=RNG(J)/DZ(J) + 1.0
52.000      IRNG(J)=MAX0(1,IRNG(J))
53.000      30 CONTINUE
54.000 C-----
55.000      RETURN
56.000      END

```

```
1.000      SUBROUTINE PITTER
2.000      INTEGER H,HH
3.000      COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),
4.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
5.000      COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)
6.000      COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
8.000      * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDLS,KZ,MA,MAD(3,10)
9.000      COMMON/SLOP/RNG(12),IRNG(12),DZ(12)
10.000     COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,O(10,500)
11.000     COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOC(12),IDAY(12)
12.000     COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KEY2(10),K0,K1,K2,K3,K4
13.000     COMMON/COORD/XL(12),YL(12)
14.000     DIMENSION TDO(12),KK(12)
15.000 C -----
16.000 C      SR PITTER ALTERS THE TIME SPENT AT AN HOME INSERT
17.000 C      THROUGH AN ITERATIVE PROCESS BASED ON THE NUMBER OF
18.000 C      ACTIVITIES AND THE PARAMETER 'DT'.  EACH SUCCEEDING
19.000 C      ACTIVITY (LEVEL) IS ADJUSTED OVER THE APPROPRIATE
20.000 C      RANGE IDENTIFIED IN SR RANGER.
21.000 C      AT EACH BOTTOM LEVEL, SR PITTER IS ACCESSED WHICH
22.000 C      (1) COMPUTES PATTERN SPECIFIC CHARACTERISTICS,
23.000 C      (2) CALLS SR CRITER (IF K0=1), AND
24.000 C      (3) CALLS SR SPITTER
25.000 C -----
26.000 C
27.000 C      INITIALIZE SEQUENCE START TIMES AND DURATIONS:
28.000 C -----
29.000      TS(1)=TES(1)-DZ(1)
30.000      DO 10 J=2,N
31.000      TD(J)=TD(J)-DZ(J)
32.000      TDO(J)=TD(J)
33.000      10 CONTINUE
34.000 C -----
35.000 C      GRAND DISPATCHER LOOP:
36.000 C -----
37.000 C      (INITIALIZE FIRST LEVEL)
38.000      II=IRNG(1)
39.000      DO 100 I=1,II
40.000      TS(1)=TS(1)+DZ(1)
41.000      IF(N,NE,1) GO TO 20
42.000      CALL PATTN
43.000      GO TO 100
44.000      20 J=1
45.000 C
46.000 C      (NESTED LEVEL DROP)
47.000      30 J=J+1
48.000      JUMP=1
49.000      KICK=0
50.000      KK(J)=IRNG(J)
51.000 C
52.000 C      ('KICK' - ADJUST LOOP ITERATION COUNTER)
53.000      40 KK(J)=KK(J) - KICK
54.000      IF(KK(J),NE,0) GO TO 50
55.000      JUMP=JUMP+1
56.000      GO TO 70
57.000 C
58.000 C      (DISPATCHING LOOP)
59.000      50 IF(KICK,NE,0) GO TO 51
60.000      TD(J)=TDO(J)
```



```
63.000      1000) - 1000) / 1000)
64.000      IF(N,NE,J) GO TO 30
65.000      CALL PATTN
66.000      60 CONTINUE
67.000 C
68.000 C      (LOOP BOTTOM - (JUMP' UP A LEVEL)
69.000      70 KICK=1
70.000      J=N-JUMP
71.000 C      (RESET LOWER LEVEL LOOP COUNTER)
72.000      KK(J+1)=IRNG(J+1)
73.000      IF(J,NE,1) GO TO 40
74.000      100 CONTINUE
75.000 C      -----
76.000 C      END GRAND LOOP;
77.000 C      -----
78.000      RETURN
79.000      END
```

E XPATTER
TY

```

1.000 SUBROUTINE PATTERN
2.000 INTEGER H,HH
3.000 COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),
4.000 * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
5.000 COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)
6.000 COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000 COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
8.000 * ,NTOUR,KHNN,KPN,IGLOD,START,END,NDIS,KZ,MA,MAD(3,10)
9.000 COMMON/ITER/ITRACK,IDBS,NTRACK,JOBN,O(10,500)
10.000 COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KFY2(10),K0,K1,K2,K3,K4
11.000 COMMON/COORD/XL(12),YL(12)
12.000 COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOC(12),IDAY(12)
13.000 C -----
14.000 C COMPUTE THE PATTERN SPECIFIC CHARACTERISTICS FOR EACH
15.000 C PATTERN GENERATED ITERATIVELY THRU SR PITTER, AND:
16.000 C 1. INCREMENT PATTERN COUNTER
17.000 C 2. COMPUTE OBJECTIVE VALUES (SR CRITER)
18.000 C 3. OUTPUT RESULTS (SR SPITTER)
19.000 C -----
20.000 C INITIALIZE FOR FIRST ACTIVITY:
21.000 C -----
22.000 TA(1)=TS(1)
23.000 TI(1)=0.0
24.000 TF(1)=TS(1)+TD(1)
25.000 C
26.000 C REPEAT FOR SUCCESSIVE ACTIVITIES:
27.000 C -----
28.000 DO 20 J=2,N
29.000 X=TF(J-1) + D(J,J-1)
30.000 Y=TB(J)
31.000 TA(J)=X
32.000 TS(J)=AMAX1(X,Y)
33.000 C
34.000 C INSURE START TIME LESS THAN LATEST START TIME:
35.000 C -----
36.000 IF(TS(J).GT.,TLS(J)+0.02)GO TO 50
37.000 TI(J)=TS(J)-TA(J)
38.000 TF(J)=TS(J)+TD(J)
39.000 C * ADJUST DURATION/IDLE FOR PAIRED HOME ACTIVITIES
40.000 C (IF HOME INSERT PRECEDES PLANNED HOME ACTIVITY,ADD LATTER
41.000 C IDLE TIME TO FORMER DURATION,AND ADJUST START/FINISH TIMES)
42.000 IF(H(J-1).NE.0 .OR. HH(J).NE.16) GO TO 20
43.000 TD(J-1)=TD(J-1)+TI(J)
44.000 TF(J-1)=TF(J-1)+TI(J)
45.000 TA(J)=TA(J)+TI(J)
46.000 TI(J)=0.0
47.000 20 CONTINUE
48.000 C
49.000 C INCREMENT PATTERN COUNTER:
50.000 C -----
51.000 ITRACK=ITRACK+1
52.000 C -----
53.000 C IF K0 EQUALS '1', CALL SR CRITER - WHICH COMPUTES
54.000 C MULTI-OBJECTIVE VALUES FOR EACH DERIVED PATTERN
55.000 C -----
56.000 IF(K0.NE.0) CALL CRITER
57.000 C -----
58.000 C CALL SR SPITTER TO PRODUCE OUTPUT OF FEASIBLE PATTERNS
59.000 C -----
60.000 CALL SPITTER
61.000 C -----
62.000 50 RETURN

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1.000      SUBROUTINE SPITTER
2.000      COMMON/DIST/D(12,12),ACT(12,20),N,NFILE,A(12,20),DIS(12,12)
3.000      * ,NTOUR,KHHN,KPN,IGLOO,START,END,NDIS,KZ,MA,MAD(3,10)
4.000      COMMON/CONN/EAT(12),TOUR(12),BARF(12),ILOC(12),IDAY(12)
5.000      COMMON/CHAR/TS(12),TF(12),TD(12),TB(12),TE(12),H(12),
6.000      * M(12),HH(12),LOC(12),IMP(12),IFREQ(12),KNOW(12)
7.000      COMMON/COORD/XL(12),YL(12)
8.000      COMMON/PAT/TES(12),TLS(12),KFEAS,TA(12),TI(12)
9.000      COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,D(10,500)
10.000     COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KEY2(10),K0,K1,K2,K3,K4
11.000     INTEGER H,HH
12.000     DIMENSION ALPH(10,3),TT(12)
13.000     DATA ((ALPH(I,J),J=1,3),I=1,6)/'TRAV','EL T','IME ',
14.000     *'COMP','LEXI','TY ','WAIT','TIM','E ','SLAC',
15.000     *'K TI','ME ','FLEX','IBIL','ITY ','TIME',' AT ',
16.000     *'HOME'/
17.000 C-----
18.000 C      OUTPUT GENERATED FEASIBLE PATTERN TO FILE 'FEASOUT'
19.000 C      (F:15) AND OPTIONALLY TO PRINTER (F:108).
20.000 C      IF OBJECTIVE VALUES ARE COMPUTED, MAY OPTIONALLY
21.000 C      OUTPUT TO PRINTER (OUTPUT TO FILE 'OBJOUT' IS
22.000 C      EXECUTED, AFTER ALL PATTERNS ARE GENERATED, IN
23.000 C      THE MAIN SNOOPER ROUTINE.
24.000 C-----
25.000 C      VARIABLES TABULATED:
26.000 C      -----
27.000 C          1. ACTIVITY NUMBER          8. TRAVEL TIME
28.000 C          2. ACTIVITY TYPE           9. ARRIVAL TIME
29.000 C          3. IMPORTANCE                10. WAITING TIME
30.000 C          4. FREQUENCY                 11. STARTING TIME
31.000 C          5. PLANNED                   12. DURATION
32.000 C          6. LOCATION                   13. FINISH TIME
33.000 C          7. MODE                       14.
34.000 C-----
35.000 C
36.000 C      COMPUTE TRAVEL TIMES
37.000 C      -----
38.000      TT(1)=D(N+1,1)
39.000      DO 55 J=2,N
40.000 55 TT(J)=D(J-1,J)
41.000 C
42.000 C      INSERT FINAL RETURN HOME TRIP (IF NECESSARY)
43.000 C      -----
44.000      NN=N
45.000      IF(HH(N).EQ.16)GO TO 60
46.000      NN=N+1
47.000      H(NN)=0
48.000      HH(NN)=16
49.000      IMP(NN)=0
50.000      IFREQ(NN)=0
51.000      KNOW(NN)=0
52.000      LOC(NN)=IGLOO
53.000      M(NN)=M(NN-1)
54.000      TT(NN)=D(NN,NN-1)
55.000      TA(NN)=TF(NN-1)+TT(NN)
56.000      TS(NN)=TA(NN)
57.000      TI(NN)=0.0
58.000      TD(NN)=0.0
59.000      TF(NN)=0.0
60.000 C

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63.000 60 WRITE(15,210)IOBS,KHHN,KPN,ITRACK,NN
64.000 210 FORMAT(5I5)
65.000 C
66.000 C OUTPUT PATTERNS
67.000 C -----
68.000 65 WRITE(108,105)KHHN,KPN,ITRACK
69.000 105 FORMAT(/' HOUSEHOLD',I5,' INDIVIDUAL',I5,
70.000 .20X,' FEASIBLE PATTERN ',I4/1X,19(4H----),2H--)
71.000 WRITE(108,110)
72.000 110 FORMAT(' I I',5X,'ACTIVITY',6X,' I TRAVEL I',6X,'TEMPORAL',
73.000 . ' SPECIFICATIONS I',5X,' I'/' I I',19(1H-),1HI,10(1H-),
74.000 . 1HI,35(1H-),1HI,5X,1HI/' I I', 'NO TP IM FR KN ZONEIMODE',
75.000 . ' TIME|ARRIVAL IDLE START LENGTH FINISH I'/' I',
76.000 . 25(3H---),2H-1)
77.000 DO 30 J=1,NN
78.000 IF(K1,NE,0)WRITE(108,115)J,H(J),HH(J),IMP(J),IFREQ(J),
79.000 . KNOW(J),LOC(J),M(J),TT(J),TA(J),TI(J),TS(J),TD(J),TF(J)
80.000 WRITE(15,116)J,H(J),HH(J),IMP(J),IFREQ(J),KNOW(J),LOC(J),
81.000 . M(J),TT(J),TA(J),TI(J),TS(J),TD(J),TF(J)
82.000 30 CONTINUE
83.000 115 FORMAT(' I',I2,' I',I2,4I3,I4,' I',I3,F6.2,' I',5F7.2,
84.000 . ' I',5X,' I')
85.000 116 FORMAT(2(2X,I2),4I3,2(I4,1X),F5.2,2X,5F7.2)
86.000 IF(K1,NE,0)WRITE(108,120)
87.000 120 FORMAT(1X,19(4H----),2H--)
88.000 C
89.000 C OUTPUT ASSOCIATED CRITERIA
90.000 C -----
91.000 IF(K2,EQ,0)GO TO 90
92.000 WRITE(108,125)
93.000 125 FORMAT(/15X,' MULTI-OBJECTIVE CRITERIA'/16X,12(2H--)/
94.000 *15X,' OBJECTIVE VALUE'/16X,12(2H--))
95.000 DO 70 J=1,NOBJ
96.000 II=KEY2(J)
97.000 70 WRITE(108,130)J,(ALPH(II,KK),KK=1,3),0(J,ITRACK)
98.000 130 FORMAT(16X,I2,1X,3A4,F9.2)
99.000 WRITE(108,135)
100.000 135 FORMAT(16X,12(2H--)/)
101.000 C-----
102.000 90 RETURN
103.000 END

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1.000      SUBROUTINE CRITER
2.000      INTEGER H,HH
3.000      COMMON/CHAR/TS(10),TF(10),TD(10),TB(10),TE(10),H(10)
4.000      *,M(10),HH(10),LDC(10),IMP(12),IFREQ(12),KNOW(12)
5.000      COMMON/PAT/TES(10),TLS(10),KFEAS,TA(12),TI(12)
6.000      COMMON/PAR/V(5),DT,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000      COMMON/DIST/D(10,10),ACT(10,8),N,NFILE,A(10,8),DIS(10,10)
8.000      *,NTOUR,KHNN,KPN,IGLOD,START,END,NDIS,KZ,MA,MAD(3,10)
9.000      COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,O(10,500)
10.000     COMMON/OBJPAR/NOBJ,KOBJ(10),KEY(10),KEY2(10),K0,K1,K2,K3,K4
11.000     COMMON/COORD/XL(10),YL(10)
12.000     COMMON/CONN/EAT(10),TOUR(10),BARF(10),ILOD(12),IDAY(12)
13.000 C-----
14.000 C      ACCESS THE MULTI-OBJECTIVES ROUTINES DESIRED
15.000 C      THROUGH PARAMETER KEY(I). THESE VALUES MAY BE
16.000 C      COMPUTED IN THE SMOOPER MODULE
17.000 C-----
18.000      JOBN=0
19.000 C      IF(KEY(1).EQ.1) CALL FAKER
20.000 C      IF(KEY(2).EQ.1) CALL MDVER
21.000 C      IF(KEY(3).EQ.1) CALL WAITER
22.000 C      IF(KEY(4).EQ.1) CALL RISKER
23.000 C      IF(KEY(5).EQ.1) CALL HOMER
24.000 C-----
25.000      RETURN
26.000      END

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64.000 C
65.000 C OUTPUT: F:32 THROUGH F:42 (TEMP2 - TEMP12)
66.000 C - TEMPORARY STORAGE OF GROUP RESULTS
67.000 C F:50 - FINAL PATTERN CENTROIDS (RAPS)
68.000 C F:51 - SYNTHESIZED REPRESENTATIVE
69.000 C ACTIVITY PATTERNS (RAPSSYN)
70.000 C F:52 - COORDINATES OF PATTERN
71.000 C CLOSEST TO GROUP CENTROIDS (RAPSMIN)
72.000 C F:53 - CHOICE SET OBJECTIVE VALUES
73.000 C FOR FINAL PATTERNS (RAPSOBJ)
74.000 C F:54 - OBSERVED CHOICE ASSIGNMENTS (RAPSASS)
75.000 C -----
76.000 C
77.000 C -----

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78.000 C CLASSIFICATION INPUT PARAMETERS:
79.000 C -----

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80.000 C NOBS = NUMBER OF INDIVIDUALS TO BE ANALYZED
81.000 C NCHAR = NUMBER OF CHARACTERISTICS PER PATTERN
82.000 C MINRAP = MINIMUM NUMBER OF REPRESENTATIVE PATTERNS
83.000 C MAXRAP = MAXIMUM NUMBER OF REPRESENTATIVE PATTERNS
84.000 C MAXITR = MAXIMUM NUMBER OF CLASSIFICATION ITERATIONS
85.000 C NARB = 1 , FOR RANDOM SELECTION OF INITIAL RAPS
86.000 C (DEFAULT TO FIRST 'KG' PATTERNS)
87.000 C ICON = MAXIMUM ITERATIONS FOR CLUSTER STABILITY TEST
88.000 C (DEFAULT IS A SINGLE PASS - NO TEST)
89.000 C NF = INPUT PATTERN DATA FILE
90.000 C (DEFAULT = 15 FEASIBLE PATTERNS(SNOOPER))
91.000 C

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92.000 C PROGRAM OPTIONS: (SET TO '0' IF NOT DESIRED)
93.000 C -----

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94.000 C PROGRAM ALWAYS PRINTS A CLASSIFICATION SUMMARY
95.000 C
96.000 C IOPT(1) = 1 PRINT PATTERN MEMBERSHIP FOR EACH RHAP
97.000 C IOPT(2) = 1 PRINT THE CENTROIDS OF EACH PATTERN GROUP
98.000 C IOPT(3) = 1 PRINT OUT SUMS OF SQUARED DEVIATIONS MATRIX
99.000 C IOPT(4) = 1 PRINT STATISTIC SUMMARY TABLE
100.000 C IOPT(5) = 1 PRINT OUT THE PATTERN CHANGE TABLE
101.000 C IOPT(6) = 1 SELECT 'BEST' CHOICE SET (PSEUDO F-RATIO)
102.000 C IOPT(7) = 1 PLACE OBSERVED PATTERN INTO BEST
103.000 C REPRESENTATIVE ACTIVITY PATTERN (RAP)
104.000 C = 2 ALSO OUTPUT OBSERVED CHOICE ASSIGNMENTS (F:54)
105.000 C IOPT(8) = 1 OUTPUT PATTERN CENTROIDS (F:50)
106.000 C IOPT(9) = 1 SYNTHESIZE EXPLICIT REPRESENTATIVE PATTERNS
107.000 C = 2 CHOOSE 'CLOSEST' HAP AS EXPLICIT RHAP
108.000 C IOPT(10) = 1 PRINT CLOSEST HAP ASSIGNMENT TABLE
109.000 C IOPT(11) = 1 PRINT FIRST 10 (MAX) HAPS GENERATED
110.000 C = 2 PRINT ALL GENERATED HAPS (WARNING: OPTION
111.000 C MAY RESULT IN SIGNIFICANT PRINTED OUTPUT)
112.000 C IOPT(12) = 1 COMPUTE OBJECTIVE VALUES (F:53)
113.000 C IOPT(13) = 1 PRINT OBSERVED ACTIVITY PROGRAM
114.000 C IOPT(14) = 1 OUTPUT SYNTHESIZED PATTERNS (F:51)
114.100 C = 2 OUTPUT 'CLOSEST' PATTERN FILE (F:52)
115.000 C IOPT(15) = not used
116.000 C

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117.000 C PROGRAM VARIABLES:
118.000 C -----

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119.000 C N = NUMBER OF ACTIVITY PATTERNS TO BE ANALYZED
120.000 C NA = NUMBER OF PLANNED ACTIVITIES
121.000 C
122.000 C (Data specification: J=1,NCHAR)
123.000 C IDISC(J) = 1 for discrete variables (0 for continuous)
124.000 C INOM(J) = 0 at least ordinal variables (1 for nominal)
125.000 C NVAL(J) = number of values (k) for a discrete variable
126.000 C VAL(K,J) = actual values taken by the discrete variable

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129.000 C      MAXGR = maximum number of RHAP's for an individual
130.000 C      KARB = 1 for random initialization for individual
131.000 C      NOBSER = program counter for individuals
132.000 C
133.000 C      FMT1(I) = INPUT/OUTPUT FORMAT FOR CASE LABEL
134.000 C      FMT2(I) = INPUT FORMAT FOR PATTERN LABEL
135.000 C      FMT3(I) = INPUT/OUTPUT FORMAT FOR PATTERN DATA
136.000 C      FMT4(I) = INPUT FORMAT FOR OBSERVED ACTIVITY PATTERN
137.000 C-----

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138.000 C
139.000 C      PRODUCE OUTPUT HEADER
140.000 C-----

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141.000      WRITE(108,799)
142.000 799  FORMAT(1H1///)
143.000      WRITE(108,800)
144.000 800  FORMAT(
145.000      .12X,52H***** GROOPER *****/
146.000      .12X,52H*                                     */
147.000      .12X,52H*          CHAINING BEHAVIOR IN URBAN TRIP MAKING      */
148.000      .12X,52H*                                     */
149.000      .12X,52H*          C H A I N S                                */
150.000      .12X,52H*                                     */
151.000      .12X,52H*  Complex Household Activity Interaction Simulator */
152.000      .12X,52H*                                     */
153.000      .12X,52H*          Module # 4 -- GROOPER                       */
154.000      .12X,52H*          (Version GROOPIC Sept.6,1982)              */
155.000      .12X,52H*                                     */
156.000      .12X,52H*          Specification of Pattern Choice Set Through */
157.000      .12X,52H*          Identification of Representative Patterns  */
158.000      .12X,52H*                                     */
159.000      .12X,52H*          W.W.RECKER M.G.MCNALLY G.S.ROOT          */
160.000      .12X,52H*                                     */
161.000      .12X,52H***** GROOPER *****)

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```

162.000 C-----
163.000 C
164.000 C      (1) DIRECT ANALYSIS OF PATTERN CHARACTERISTICS UTILIZING
165.000 C      A MULTIPLE SCALE, SCORING FUNCTION
166.000 C

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167.000      CALL SCORER
168.000 C-----

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169.000 C      (2) ANALYSIS THROUGH HAAR TRANSFORMATION
170.000 C      *** TO BE ADDED ***
171.000 C-----

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```

172.000 C      (3) ANALYSIS THROUGH WALSH/HADAMARD TRANSFORMATION
173.000 C      *** NOT FULLY INTEGRATED ***
174.000 C      CALL MIRROR
175.000 C-----

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176.000      WRITE(108,808)(TITLE(I),I=1,18)
177.000      WRITE(108,840)NOBS
178.000 840  FORMAT(/3X,'EXECUTION TERMINATED NORMALLY AFTER',
179.000      * 15,' INDIVIDUALS'//)
180.000      RETURN
181.000      END

```



```

1,000 SUBROUTINE SCORER
2,000 C-----
3,000 C SPECIFICATION OF PATTERN CHOICE SET
4,000 C -----
5,000 C
6,000 C PATTERN RECOGNITION AND CLASSIFICATION THROUGH
7,000 C DIRECT ANALYSIS OF PATTERN CHARACTERISTICS
8,000 C -----
9,000 C
10,000 COMMON/INFO/NORBSER,NORBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
11,000 * ICON,NF,N,NA,IOBS,KHHN,KPN,IGLDO,START,END,WVAR(15),
12,000 * JUMP,INT,NGR,NUMB,NI TER,NCOL,MEMB(15),FRATIO(15),
13,000 * IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
14,000 * COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
15,000 * MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
16,000 * COMMON/SCORE/NVAL(20),VAL(12,20),NZ(12,6,20,15),IDISC(20),
17,000 * INDM(20),SCAL(6,20)
18,000 C VIRTUAL HAP(6,20,250),RHAP(11,21,15),
19,000 C * ITRACK(15,250),IRESP(15,250)
20,000 * DIMENSION TITLE(18),ALPH(3,2),YESNO(2)
21,000 * DATA ALPH/4HNON-,4HINFE,4HRIDR,4H, , 4HFEAS,4HIBL/
22,000 * DATA YESNO/3HYES,3H NO/
23,000 C -----
24,000 C INPUT PATTERN CLASSIFICATION PARAMETERS
25,000 C -----
26,000 READ(31,100)(TITLE(I),I=1,18)
27,000 WRITE(108,20A4)
28,000 * 100 FORMAT(108,808)(TITLE(I),I=1,18)
29,000 * 808 FORMAT(//2X,19(4H-----)/4X,18A4/2X,19(4H-----))
30,000 * WRITE(108,810)
31,000 * 810 FORMAT(//4X,12HFILE OUTPUT:/
32,000 * 9X,53HRAPS - PATTERN CENTROIDS FOR THE CHOICE SET (F:50)/
33,000 * 9X,53HRAPSSYN - SYNTHESIZED REPRESENTATIVE PATTERNS (F:51)/
34,000 * 9X,53HRAPSMIN - CLOSEST ACTIVITY PATTERNS (F:52)/
35,000 * 9X,53HRAPSOBJ - PATTERN CHOICE SET OBJECTIVE VALUES (F:53)/
36,000 * 9X,53HRAPSASS - OBSERVED CHOICE ASSIGNMENTS (F:54)//)
37,000 C -----
38,000 READ(31,120)NORBS,NCHAR,MINRAP,MAXRAP,MAXITR,NARB,ICON,
39,000 * NF,(IOPT(I),I=1,15)
40,000 * 120 FORMAT(815/15I5)
41,000 * IF(ICON,EQ,0)ICON=1
42,000 * JJ=1
43,000 * IF(NF,EQ,0)NF=15
44,000 * IF(NF,EQ,15)JJ=2
45,000 * KK=2
46,000 * IF(NARB,EQ,1)KK=1
47,000 * IF(MINRAP,EQ,1)MINRAP=2
48,000 * IF(MAXRAP,LT,MINRAP)MAXRAP=MINRAP
49,000 C -----
50,000 C PRINT ANALYSIS PARAMETERS
51,000 C -----
52,000 WRITE(108,815)
53,000 * 815 FORMAT(//14X,11(4H-----)/15X,'DIRECT ANALYSIS OF',
54,000 * ' PATTERN CHARACTERISTICS',/14X,11(4H-----)/)
55,000 * WRITE(108,820)NORBS,NCHAR,MINRAP,MAXRAP,MAXITR,YESNO(KK),
56,000 * ICON,NF,(ALPH(I,JJ),I=1,3)
57,000 * 820 FORMAT(14X,'NUMBER OF INDIVIDUALS ANALYZED, . . .',/
58,000 * 13/14X,'NUMBER OF PATTERN CHARACTERISTICS, . . .',/13/
59,000 * 14X,'MINIMUM NUMBER OF RAP CLUSTERS, . . .',/13/
60,000 * 14X,'MAXIMUM NUMBER OF RAP CLUSTERS, . . .',/13/

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63.0000 * 14X, 'PATTERNS FOR CLUSTER STABILITY. . . . 'I3/
64.0000 * 14X, 'PATTERN DATA INPUT FILE . . . . 'I3/
65.0000 * 14X, 'INPUT ACTIVITY PATTERNS ARE . . . '3A4///)
66.0000 C
67.0000 C READ AND SETUP DATA AS NECESSARY
68.0000 C -----
69.0000 READ(31,130)(IDISC(J),J=1,NCHAR)
70.0000 130 FORMAT(20I4)
71.0000 READ(31,130)(INOM(J),J=1,NCHAR)
72.0000 READ(31,130)(NVAL(J),J=1,NCHAR)
73.0000 DO 30 J=1,NCHAR
74.0000 NVAL=NVAL(J)
75.0000 IF(NNVAL.EQ.0)GO TO 30
76.0000 READ(31,140)(VAL(K,J),K=1,NNVAL)
77.0000 140 FORMAT(12F5.0)
78.0000 30 CONTINUE
79.0000 C
80.0000 C FORMATS FOR INPUT OF ACTIVITY PATTERNS
81.0000 C -----
82.0000 READ(31,150)(FMT1(I),I=1,20),(FMT2(I),I=1,20),
83.0000 (FMT3(I),I=1,20),(FMT4(I),I=1,20)
84.0000 150 FORMAT(20A4/20A4/20A4/20A4)
85.0000 C*****
86.0000 C
87.0000 C -----
88.0000 C *** DIRECT ANALYSIS OF PATTERN CHARACTERISTICS ***
89.0000 C -----
90.0000 DO 50 NOBSER=1,NOBS
91.0000 JUMP=0
92.0000 MINGR=MINRAP
93.0000 MAXGR=MAXRAP
94.0000 KARB=NARB
95.0000 C
96.0000 C * ELEMENT # 1 - DATA TRANSFORMATION
97.0000 C -----
98.0000 CALL CRACKER(&49)
99.0000 C
100.0000 C * ELEMENT # 2 - PATTERN RECOGNITION/CLASSIFICATION
101.0000 C -----
102.0000 CALL RAPPER
103.0000 C
104.0000 C * ELEMENT # 3 - CHOICE SET SPECIFICATION
105.0000 C -----
106.0000 C SR PICKER SELECTS THE 'BEST' PATTERN CHOICE SET
107.0000 C IF(IOPT(6).EQ.1) CALL PICKER
108.0000 C
109.0000 C * ELEMENT # 4 - SPECIFICATION OF OBSERVED CHOICE
110.0000 C -----
111.0000 C SR STICKER IS OPTIONALLY ACCESSED FROM SR PICKER
112.0000 C FOR THE CLASSIFICATION OF THE OBSERVED CHOICE
113.0000 C
114.0000 C * ELEMENT # 5 - SYNTHESIS OF REPRESENTATIVE PATTERNS
115.0000 C -----
116.0000 C IF(IOPT(9).EQ.1) CALL MOOGER
117.0000 C
118.0000 C * ELEMENT # 6 - COMPUTATION OF OBJECTIVE VALUES
119.0000 C -----
120.0000 C IF(IOPT(12).EQ.1) CALL CRITER
121.0000 C -----
122.0000 C REWIND SCRATCH FILES:
123.0000 C -----
124.0000 DO 40 I=MINGR,MAXGR
125.0000 II=I+30
126.0000 40 REWIND II
127.0000 C -----

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130.000 49 WRITE(108,830)NOBSER
131.000 830 FORMAT(/21X,38(1H*)/
132.000 . 1X,20(1H*),'* END OF ANALYSIS -- OBSERVATION',
133.000 . I4,2H *,20(1H*)/21X,38(1H*)//)
134.000 50 CONTINUE
135.000 C-----
136.000 C*****
137.000 WRITE(108,808)(TITLE(I),I=1,18)
138.000 WRITE(108,840)NOBS
139.000 840 FORMAT(//3X,'EXECUTION TERMINATED NORMALLY AFTER',
140.000 * I5,' INDIVIDUALS'//)
141.000 RETURN
142.000 END
```

```

1.000      SUBROUTINE CRACKER(*)
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      , ICON,NF,N,NA,IORS,KHHN,KPN,IGLOD,START,END,WVAR(15),
4.000      , JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000      , IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      ,      MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000      DIMENSION ACT(12,20),SOJRN(12),COORD(2,342),ALPH(3,2)
9.000      DATA ALPH/4HNON-,4HINFE,4HRIDR,4H FE,4HASIB,4HLE /
10.000 C   *** FILE 'XCRACKER' CONTAINS COORD ARRAY IN DATA ***
11.000 C   -----
12.000 C       SR CRACKER INPUTS PATTERNS FROM EITHER SNOOPER OR
13.000 C       SMOOPER AND BREAKS EACH PATTERN INTO ITS COMPONENT
14.000 C       PLANNED ACTIVITIES WITH THEIR RESPECTIVE CHARACTERISTICS
15.000 C       FOR ANALYSIS BY PATTERN RECOGNITION/CLASSIFICATION.
16.000 C       THE PLANNED ACTIVITIES IN EACH PATTERN ARE LISTED
17.000 C       IN THEIR ORIGINAL ORDER.
18.000 C
19.000 C       SR CRACKER ALSO PRODUCES AN ARRAY OF VARIABLES FOR
20.000 C       REPRESENTATIVE PATTERN SYNTHESIS IN SR MOOGER (IF
21.000 C       'IOPT9' IS SPECIFIED),THESE VARIABLES ARE NOT USED
22.000 C       IN PATTERN CLASSIFICATION, BUT TO FACILITATE THE
23.000 C       SYNTHESIS OF THE 'RAPS' IN THE FINAL CHOICE SET.
24.000 C   -----
25.000 C
26.000 C       PATTERN CHARACTERISTICS
27.000 C       -----
28.000 C       SR CRACKER IS PROGRAMMED TO BREAKDOWN ('CRACK')
29.000 C       GENERATED TRAVEL-ACTIVITY PATTERNS BY CHARACTERISTICS
30.000 C       OF PLANNED ACTIVITIES. ONLY THE FOLLOWING SPECIFICATION
31.000 C       IS REFLECTED. ALTERNATE CHOICE OF CHARACTERISTICS
32.000 C       NECESSITATES REPROGRAMMING OF SR CRACKER.
33.000 C
34.000 C       NCHAR      VARIABLE
35.000 C       -----
36.000 C           1      POSITION IN FULL ACTIVITY PATTERN
37.000 C           2      POSITION IN TOUR
38.000 C           3      NUMBER OF SOJOURNS IN TOUR
39.000 C           4      TOUR NUMBER
40.000 C           5      TRAVEL TIME TO ACTIVITY
41.000 C           6      WAITING TIME AT ACTIVITY
42.000 C           7      STARTING TIME OF THE ACTIVITY
43.000 C           8      ACTIVITY DURATION
44.000 C           9      MODE USED TO ACTIVITY
45.000 C          10      ACTIVITY FOLLOWED BY A RETURN HOME
46.000 C          11      TRAVEL TIME TO HOME
47.000 C          12      RESULTING DURATION AT HOME
48.000 C
49.000 C       APPENDED CHARACTERISTICS (NOT USED IN CLASSIFICATION)
50.000 C
51.000 C           13      SOJOURN LOCATION (NODE)
52.000 C           14      ACTIVITY TYPE
53.000 C           15      ACTIVITY IMPORTANCE
54.000 C           16      UNIQUE ACTIVITY LABEL
55.000 C
56.000 C       (IF IOPT(9)=1)
57.000 C
58.000 C           17      'X' LOCATION COORDINATE
59.000 C           18      'Y' LOCATION COORDINATE
60.000 C   -----
61.000 C       ROUTINE VARIABLES:

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64.000 C      INUM = Tour number
65.000 C      TPOS = Tour position
66.000 C      ACT(J,K) = Input activity pattern data array
67.000 C      HAP(I,J,K) = Activity pattern array
68.000 C
69.000 C -----
70.000 C      9 N=0
71.000 C
72.000 C      INPUT IDENTIFICATION LABEL
73.000 C      -----
74.000 C      READ(NF,FMT1,END=69)IOBS,KHHN,KPN,NA,IGL00,START,END,NN
75.000 C      (IF NF=15,NN=0 , IF NF=22,NN=NO. OF NON-INFERIOR PATS)
76.000 C      * OUTPUT IDENTIFICATION LABEL
77.000 C      WRITE(108,200)KHHN,KPN,NA,IGL00,START,END
78.000 C      200 FORMAT(1H1//,1X,34(1H*)/
79.000 C      , ' * HOUSEHOLD ',I5,16X,1H*/1X,34(1H*)/
80.000 C      , ' * INDIVIDUAL ',I5,16X,1H*/ ' * PLANNED ACTIVITIES',
81.000 C      , I7,4X,1H*/ ' * HOME LOCATION',5X,I7,4X,1H*/
82.000 C      , ' * TRAVEL DAY START',5X,F7.2,1X,1H*/
83.000 C      , ' * TRAVEL DAY END',7X,F7.2,1X,1H*/1X,34(1H*)//)
84.000 C
85.000 C      10 N=N+1
86.000 C
87.000 C      READ ACTIVITY PATTERN DATA
88.000 C      -----
89.000 C      READ(NF,FMT2)KEY,NACT,LABEL(N)
90.000 C      IF(KEY.EQ.9999)GO TO 90
91.000 C
92.000 C      TNUM=1.
93.000 C      TPOS=0.
94.000 C      DO 30 J=1,NACT
95.000 C      30 READ(NF,FMT3)(ACT(J,K),K=1,13)
96.000 C      CINPUT: H,HH,IMP,FREQ,KNOW,LOC,M,TT,TA,TI,TS,TD,TFJ
97.000 C      * LAST RECORD IS FINAL RETURN HOME TRIP, WITH DURATION
98.000 C      SET TO ZERO. THE HAP ARRAY WILL REFLECT THIS RETURN TO
99.000 C      HOME AND THE CORRESPONDING TRAVEL TIME, BUT NOT THE
100.000 C      RESULTING DURATION.
101.000 C
102.000 C      COMPUTE TOUR-SPECIFIC VARIABLES
103.000 C      -----
104.000 C      DO 60 J=1,NACT
105.000 C      IF(ACT(J,1).EQ.0.)GO TO 50
106.000 C      IPH=ACT(J,1)
107.000 C      HAP(IPH,1,N)=J
108.000 C      HAP(IPH,5,N)=ACT(J,8)
109.000 C      HAP(IPH,6,N)=ACT(J,10)
110.000 C      HAP(IPH,7,N)=ACT(J,11)
111.000 C      HAP(IPH,8,N)=ACT(J,12)
112.000 C      HAP(IPH,9,N)=ACT(J,7)
113.000 C      HAP(IPH,10,N)=0.0
114.000 C      HAP(IPH,11,N)=0.0
115.000 C      HAP(IPH,12,N)=0.0
116.000 C      (CHAR.13-16 ARE NOT USED IN CLASSIFICATION,
117.000 C      ONLY IN CRITERION SPECIFICATION AND OUTPUT)
118.000 C      * SPECIFY NUMBER OF ADDED CHARACTERISTICS (NUMB)
119.000 C      NUMB=4
120.000 C      HAP(IPH,13,N)=ACT(J,6)
121.000 C      HAP(IPH,14,N)=ACT(J,2)
122.000 C      HAP(IPH,15,N)=ACT(J,3)
123.000 C      HAP(IPH,16,N)=ACT(J,1)
124.000 C      85 CONTINUE
124.100 C      * (IF LAST ACTIVITY IS PLANNED HOME, PASS NEXT 'IF')
124.200 C      IF(J.EQ.NACT)GO TO 36
125.000 C      IF(ACT(J+1,1).NE.0.)GO TO 35
126.000 C      HAP(IPH,10,N)=1.0

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128,000 HAF(IPH,12,N)=ACT(J+1,12)
129,000 C
130,000 35 IF(ACT(J,2),NE,16,) GO TO 40
131,000 36 HAF(IPH,2,N)=0.0
132,000 HAF(IPH,3,N)=0.0
133,000 HAF(IPH,4,N)=0.0
134,000 GO TO 50
135,000 40 TPOS=TPOS+1.0
136,000 HAF(IPH,2,N)=TPOS
137,000 HAF(IPH,4,N)=TNUM
138,000 IF(J,NE,NACT) GO TO 60
139,000 C
140,000 50 IF(TPOS,EG,0.0) GO TO 60
141,000 IT=TNUM
142,000 SOURN(IT)=TPOS
143,000 TPOS=0.
144,000 TNUM=TNUM+1.
145,000 60 CONTINUE
146,000 C
147,000 SET SOURN NUMBER
148,000 C
149,000 DO 70 J=1,NA
150,000 IT=HAF(J,4,N)
151,000 IF(IT,EG,0) GO TO 70
152,000 HAF(J,3,N)=SOURN(IT)
153,000 70 CONTINUE
154,000 C
155,000 APPEND COORDINATE VARIABLES FOR SYNTHESIS
156,000 C
157,000 IF(IOP19,NE,1) GO TO 10
158,000 C
159,000 INPUT SPATIAL COORDINATE CONVERSIONS
160,000 C
161,000 74 IF(NOSR,GT,1) GO TO 77
162,000 DO 75 J=1,342
163,000 75 READ(48,500)(COORD(I,J),I=1,2)
164,000 C
165,000 500 FORMAT(20X,2F10.1)
166,000 DO080 J=1,NA
167,000 HAF(J,NUMR+1,N)=COORD(1,HAF(J,14,N))
168,000 HAF(J,NUMB+2,N)=COORD(2,HAF(J,14,N))
169,000 C
170,000 READ NEW PATTERN
171,000 C
172,000 GO TO 10
173,000 C
174,000 90 N=N-1
175,000 IF(N,EG,0) GO TO 68
176,000 IF(LABEL(1),NE,0) GO TO 110
177,000 DO 100 I=1,N
178,000 LABEL(I)=I
179,000 C
180,000 110 JJ=1
181,000 IF(NF,EG,15) JJ=2
182,000 WRITE(108,106)N,(ALPH(I,JJ),I=1,3),NF
183,000 C
184,000 106 FORMAT(// ** DATA PREPARATION COMPLETE **//2X,
185,000 *(AFTER PROCESSING,4141X,3A4*, PATTERNS ON FILE,413,1H)//)
186,000 C
187,000 ** OPTIONAL DEBUG OUTPUT OF THE GENERATED HAF ARRAY **
188,000 C
189,000 NN=10
190,000 IF(IOP1(11)-1)125,122,121
191,000 121 NN=N
192,000 122 NN=MINO(N,NN)
193,000 WRITE(108,115)NN
194,000 115 FORMAT(/2X, ** GENERATED HAF ARRAY **//5X,(FIRST,

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177.000
195.000 C 116 FORMAT(/I4,4F3.0,2F5.2,2F6.2,2F3.0,2F5.2,2F5.0,2F3.0/
196.000 C . (4X,4F3.0,2F5.2,2F6.2,2F3.0,2F5.2,2F5.0,2F3.0))
197.000 C
198.000 C TEST FOR INSUFFICIENT PATTERNS
199.000 C -----
200.000 C 125 IF(N,GE,MAXGR) GO TO 150
201.000 C * (ADJUST CLASSIFICATION PARAMETERS TO REFLECT THE
202.000 C AVAILABLE NUMBER OF POTENTIAL PATTERNS)
203.000 C
204.000 C 130 MAXGR=N
205.000 C IF(N,LT,MINGR)MINGR=N
206.000 C KARB=0
207.000 C WRITE(108,135)MINGR,MAXGR
208.000 C 135 FORMAT(/14X,27HCLASSIFICATION RANGE RESET:/14X,26(1H-)/
209.000 C . 14X,36HMINIMUM NUMBER OF RAP CLUSTERS . . .,I3/
210.000 C . 14X,36HMAXIMUM NUMBER OF RAP CLUSTERS . . .,I3/
211.000 C . 14X,36HNO RANDOM SELECTION OF INITIAL RHAPS/)
212.000 C 150 WRITE(108,109)
213.000 C 109 FORMAT(/27X,5(5H*****)/1X,9(1H*),9H GROOPER ,8(1H*),
214.000 C . '* BEGINNING OF ANALYSIS *',8(1H*),9H GROOPER ,9(1H*)/
215.000 C . 27X,5(5H*****)/)
216.000 C RETURN
217.000 C -----
218.000 C 69 WRITE(108,1111)NF
219.000 C 1111 FORMAT(////' *** INPUT ERROR - EOF ON UNIT',I3,4H ****//)
220.000 C STDP 69
221.000 C -----
222.000 C 68 WRITE(108,2111)IOBS
223.000 C 2111 FORMAT(////' *** WARNING ***'/
224.000 C . 5X,'NO ACTIVITY PATTERNS INPUT FOR OBSERVATION',I5/
225.000 C . 5X,'INDIVIDUAL WILL BE SKIPPED AND PROCESS CONTINUED'//)
226.000 C RETURN 1
227.000 C -----
228.000 C END

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*E XRAPPER
*TY

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1.000 SUBROUTINE RAPPER
2.000 COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000 , ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WVAR(15),
4.000 , JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000 , IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000 COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000 , MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000 COMMON/SCORE/NVAL(20),VAL(12,20),NZ(12,6,20,15),IDISC(20),
9.000 , INOM(20),SCAL(6,20)
10.000 C VIRTUAL HAP(6,20,250),RHAP(11,21,15),
11.000 C * ITRACK(250,15),IRES(15,250)
12.000 DIMENSION DIFF(15),KX(15),SUM(15),XSUM(15)
13.000 EXTERNAL RANDOM
14.000 C -----
15.000 C SR RAPPER IS THE ACTUAL PATTERN CLASSIFIER. WHETHER
16.000 C THE INPUT IS ACTUAL PATTERN DATA OR TRANSFORMED
17.000 C COEFFICIENTS, THE ALGORITHM COMPUTES DIFFERENCE
18.000 C SCORES AND ASSIGNS NON-INFERIOR PATTERNS, PRODUCING
19.000 C FOR EACH IDENTIFIED GROUP, A REPRESENTATIVE PATTERN
20.000 C -----
21.000 C VARIABLES:
22.000 C -----
23.000 C
24.000 C CONSTRUCT SCALING FACTORS FOR STATISTICAL ANALYSIS
25.000 C -----
26.000 NN=N-1
27.000 DO 2005 I=1,NA
28.000 DO 2005 J=1,NCHAR
29.000 IF(INOM(J).NE.0)GO TO 2001
30.000 SCAL(I,J)=1.0
31.000 GO TO 2005
32.000 2001 SCAL(I,J)=0.0
33.000 DO 2002 K=1,NN
34.000 K1=K+1
35.000 DO 2002 L=K1,N
36.000 XMAX=ABS(HAP(I,J,K)-HAP(I,J,L))
37.000 SCAL(I,J)=AMAX1(SCAL(I,J),XMAX)
38.000 2002 CONTINUE
39.000 IF(SCAL(I,J).EQ.0.0)SCAL(I,J)=1.0
40.000 2005 CONTINUE
41.000 C
42.000 C INITIALIZATION FOR RANDOM NUMBER GENERATOR
43.000 C (ALT.LOCATION IN 'DO 200 LOOP' PROVIDES SAME START)
44.000 IX=1
45.000 C -----
46.000 C -----
47.000 C
48.000 C GRAND LOOP FOR ALTERNATE NUMBER OF PATTERN GROUPS
49.000 C -----
50.000 C
51.000 DO 400 NGR=MINGR,MAXGR
52.000 C
53.000 C LOOP FOR RANDOM PATTERN ASSIGNMENT
54.000 C -----
55.000 C THE INITIAL 'RHAPS' ARE RANDOMLY SELECTED FROM
56.000 C THE PATTERN SET. ALTERNATE RANDOM ASSIGNMENTS
57.000 C ARE EXECUTED AS A TEST FOR CLUSTER STABILITY.A
58.000 C MAXIMUM OF 'ICON' ITERATIONS ARE PERMITTED.
59.000 C
60.000 C *** ADD CONVERGENCE TEST ***
61.000 C
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64.000 C      INITIALIZE REPRESENTATIVE GROUP COUNTER
65.000      DO 1 I=1,N
66.000      1 INUMB(I)=0
67.000      NCOL=NGR
68.000      IF(NGR.GT.6)NCOL=6
69.000      NITER=0
70.000 C-----
71.000 C      WHEN RAPPER IS ACCESSED FROM SR STICKER (JUMP=1),
72.000 C      THE SPECIFIED REPRESENTATIVE PATTERNS ARE ASSIGNED
73.000 C      AS THE ARBITRARY PATTERNS, AND THE OBSERVED CHOICE
74.000 C      IS ASSIGNED IN THE SINGLE ITERATION PERFORMED
75.000 C-----
76.000 C (1) SET UP NGR ARBITRARY RHAP'S
77.000 C      -----
78.000 C      IX=1
79.000 C      RN=N
80.000 C      DO 10 KG=1,NGR
81.000 C      KK=KG
81.100 C      KX(KG)=KG
82.000 C      ARE ARBITRARY RAPS DESIRED?
83.000 C      IF(KARB.NE.1)GO TO 4
84.000 C      IF(JUMP.EQ.1) GO TO 4
85.000 C      2 CALL RANDOM(IX,RX)
86.000 C      KX(KG)=RX*(RN-1.0) + 1.0
87.000 C      KK=KX(KG)
88.000 C      IF(KG.EQ.1)GO TO 4
89.000 C      DO 3 K=2,KG
90.000 C      IF(KK.EQ.KX(K-1)) GO TO 2
91.000 C      3 CONTINUE
92.000 C      4 DO 5 I=1,NA
93.000 C      DO 5 J=1,NCHAR
94.000 C      RHAP(I,J,KG)=HAP(I,J,KK)
94.100 C      WRITE(108,4281)I,J,KG,RHAP(I,J,KG),KK,HAP(I,J,KK)
94.200 C4281 FORMAT(' R-H TEST: I,J,KG,RHAP=',3I3,F8.2,'      KK,HAP=',I3,F8.2)
95.000 C      IF (IDISC(J).NE.1) GO TO 5
96.000 C      NNUAL=NVAL(J)
97.000 C      COMPUTE RHAP DISCRETE SCORE FUNCTION
98.000 C      -----
99.000 C      DO 8 LL=1,NNUAL
100.000 C      NZ(LL,I,J,KG)=0
101.000 C      IF(HAP(I,J,KK).EQ.VAL(LL,J)) NZ(LL,I,J,KG)=1
102.000 C      8 CONTINUE
103.000 C      5 CONTINUE
104.000 C      ASSIGN INITIAL RHAP COUNTER,SIZE,AND MINHAP
105.000 C      -----
106.000 C      ('INUMB(I)' IS THE RAP TO WHICH HAP 'I' IS ASSIGNED,
107.000 C      'MEMB(KG)' IS THE NUMBER OF HAPS ASSIGNED TO RAP 'KG',
108.000 C      'MINHAP(NGR,KG)' IDENTIFIES THE HAP CLOSEST TO RAP 'KG'
109.000 C      IN RAP SET 'NGR'.)
110.000 C      INUMB(KK)=KG
111.000 C      MEMB(KG)=1
112.000 C      IF(JUMP.EQ.0)MINHAP(NGR,KG)=KK
113.000 C      10 CONTINUE
114.000 C      IF(KARB.NE.1 .OR. JUMP.EQ.1) GO TO 11
115.000 C
116.000 C      PRINT INITIAL RAP IDENTIFICATION
117.000 C      -----
118.000 C      WRITE(108,802)
119.000 C      802 FORMAT(//27X,25(1H-)/
120.000 C      , 27X,' I RANDOM INITIALIZATION I'/27X,1H1,23(1H-),1H1)
121.000 C      WRITE(108,804)
122.000 C      804 FORMAT(27X,1H1,3X,' RAP HAP LABEL',5X,1H1/
123.000 C      , 27X,1H1,3X,16(1H-),4X,1H1)
124.000 C      DO 805 I=1,NGR

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127.000 WRITER=1009000/
128.000 808 FORMAT(27X,25(1H-))
129.000 C
130.000 C-----
131.000 C START OF ASSIGNMENT ITERATIONS
132.000 C (DURING FIRST PASS OF THE ASSIGNMENT PROCESS, THE
133.000 C ARBITRARILY ASSIGNED RHAPS ARE NOT REASSIGNED.ON
134.000 C FUTURE PASSES,PATTERNS ARE REASSIGNED AS REQUIRED
135.000 C-----
136.000 C
137.000 11 NITER=NITER+1
138.000 NUMBER=0
139.000 DO 13 KG=1,NGR
140.000 13 XSUM(KG)=99.0
141.000 C
142.000 C (2) LOOP ASSIGNING REMAINING HAP'S TO PROPER RHAP'S
143.000 C-----
144.000 C
144.100 X WRITE(108,4282)NITER,NUMBER,(MEMB(KG),KG=1,NGR),(JNUMB(I),I=1,N)
144.200 X4282 FORMAT(// PRE <DO 100> NITER=',I5,5X,'NUMBER=',I5,' MEMB',
144.300 X , '(KG)=' ,4I5,/15X,'INUMB(I)=' ,8I5/)
145.000 DO 100 K=1,N
146.000 C
147.000 IF(NITER.NE.1) GO TO 17
148.000 DO 15 KG=1,NGR
149.000 IF(K.EQ.KX(KG))GO TO 100
150.000 15 CONTINUE
151.000 C
152.000 C SET PREVIOUS ITERATION ASSIGNMENT TO 'IGROUP'
153.000 C-----
154.000 17 IGROUP=INUMB(K)
155.000 DO 19 KG=1,NGR
156.000 19 SUM(KG)=0.0
157.000 C
158.000 C COMPUTE HAP/RHAP DIFFERENCES
159.000 C-----
160.000 DO 20 I=1,NA
161.000 DO 20 J=1,NCHAR
162.000 IF(INOM(J).NE.0) GO TO 24
163.000 DO 22 KG=1,NGR
164.000 DIFF(KG)=1.0
165.000 IF(RHAP(I,J,KG).EQ.HAP(I,J,K)) DIFF(KG)=0.0
166.000 22 CONTINUE
167.000 XMAX=1.0
168.000 GO TO 26
169.000 24 XMAX=0.0
170.000 DO 25 KG=1,NGR
171.000 DIFF(KG)=ABS(RHAP(I,J,KG)-HAP(I,J,K))
172.000 25 XMAX=AMAX1(XMAX,DIFF(KG))
173.000 IF(XMAX.EQ.0.0)XMAX=1.0
174.000 26 DO 27 KG=1,NGR
175.000 27 SUM(KG)=DIFF(KG)/XMAX+SUM(KG)
176.000 20 CONTINUE
177.000 XMIN=SUM(1)
178.000 C
179.000 C ASSIGN HAP TO THE 'BEST' RHAP GROUP
180.000 C-----
181.000 DO 28 KG=1,NGR
182.000 IF(SUM(KG).GT.XMIN) GO TO 28
183.000 XMIN=SUM(KG)
184.000 IGRN=KG
185.000 28 CONTINUE
186.000 INT=IGRN
187.000 C-----
188.000 C FOR OBSERVED CHOICE ASSIGNMENT (JUMP=1), PROCESS

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190.000 C -----
191.000     IF(JUMP, EQ, 1) RETURN
192.000     IF(IOPT(9), NE, 2) GO TO 30
193.000 C
194.000 C     STORE DEVIATION AND ID OF 'HAP' CLOSEST TO 'RHAP'
195.000 C -----
196.000     IF(SUM(IGRN), GT, XSUM(IGRN)) GO TO 30
197.000     XSUM(IGRN)=SUM(IGRN)
198.000     MINHAP(NGR, IGRN)=K
198.100     30 CONTINUE
199.000 C     (CLOSEST HAPS ARE OUTPUT FROM SR PICKER IF IOPT(6)=1)
200.100 C
201.000 C     DOES ASSIGNMENT MATCH THAT FROM PREVIOUS ITERATION?
202.000 C -----
202.100 X     WRITE(108, 4283) IGROUP, IGRN, K
202.200 X4283     FORMAT(/' PRE-CALL FLIP      IGROUP=', I5, '      IGRN=', I5, '      K=', I3/)
203.000     IF(IGROUP, EQ, IGRN) GO TO 60
204.000 C
205.000 C (3) COMPUTE NEW RHAP'S
206.000 C -----
207.000 C
208.000     IF(NITER, EQ, 1) GO TO 50
208.100 C
208.200 C     TEST FOR NULL MEMBER SET
208.300     IF(MEMB(IGROUP), EQ, 1 .AND. IC, LT, ICON) GO TO 190
208.400     IF(MEMB(IGROUP), EQ, 1) GO TO 500
209.000 C
210.000 C     REMOVE INPROPERLY ASSIGNED HAP
211.000     CALL FLIPPER(K, IGROUP, -1)
212.000     MEMB(IGROUP)=MEMB(IGROUP)-1
213.000     NUMBER=NUMBER-1
214.000 C
215.000 C     ADD NEW HAP
216.000     50 CALL FLIPPER(K, IGRN, 1)
217.000     INUMB(K)=IGRN
218.000     MEMB(IGRN)=MEMB(IGRN)+1
219.000 C
220.000 C     INCREMENT CORRECT ASSIGNMENT COUNTER
221.000 C -----
222.000     60 NUMBER=NUMBER+1
222.100 X     WRITE(108, 4284) NUMBER, (MEMB(KG), KG=1, NGR)
222.200 X4284     FORMAT(/' END (IN) <DO 100>      NUMBER=', I5, '      MEMB(KG)=' , 415/)
223.000 C
224.000     100 CONTINUE
225.000 C     (END OF PATTERN ASSIGNMENT LOOP)
226.000 C
227.000 C     WRITE(108, 860) NITER, NGR
228.000 C 860     FORMAT(3X, ' ITERATION ', I3, ' FOR ', I3, ' GROUP CASE. ')
229.000 C
230.000 C (4) ITERATION TEST
231.000 C -----
231.100     IF(NUMBER, EQ, N) GO TO 300
232.000     IF(NITER, LT, MAXITR) GO TO 11
233.000     WRITE(108, 865) MAXITR, NGR
234.000     865     FORMAT(///10X, 'UNABLE TO COMPLETE CLUSTERING AFTER ',
235.000     1     I3, ' ITERATIONS WITH ', I3, ' GROUPS')
236.000     FRATIO(NGR)=0.0
237.000     WVAR(NGR)=0.99999E 9
238.000     GO TO 400
242.000 C -----
244.000 C
245.000 C *** LOCATION OF STABILITY TEST ***
246.000 C
246.100     190 IF(KARB ,NE, 1) GO TO 500

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249.000 C-----
250.000 C (5) OUTPUT OPTIONS
251.000 C -----
252.000 C * PRINT PATTERNS ASSIGNED TO REPRESENTATIVE GROUPS
253.000 C (FEASIBLE PATTERN NUMBER OUTPUT OPTIONAL (IOPT(1)))
254.000 300 CALL MEMBER
255.000 C
256.000 C * TRACE ASSIGNMENT AS SIZE OF CHOICE SET VARIES
257.000 140 IF(IOPT(5),NE,1) GO TO 150
258.000 DO 145 I=1,N
259.000 145 ITRACK(NGR,I) = INUMB(I)
260.000 C
261.000 C * PRODUCE PATTERN CENTROIDS
262.000 C (WRITE TO F:50/RAPS,..PRINT OUTPUT OPTIONAL (IOPT(2)))
263.000 150 CALL CLONER
264.000 C
265.000 C * COMPUTE VARIANCES AND PSEUDO F-RATIOS
266.000 C (PRINTED OUTPUT OPTIONAL (IOPT(3),IOPT(4)))
267.000 160 CALL CRUNCHER
268.000 C-----
269.000 C
270.000 C (6) *** ALT. LOCATION FOR STABILITY TEST ***
271.000 C
272.000 400 CONTINUE
273.000 C
274.000 C END OF GRAND LOOP FOR ALTERNATE CHOICE SETS
275.000 C-----
276.000 C-----
277.000 C
278.000 C * PRINT TABLE OPTIONS 5 AND 10
279.000 C (PATTERN ASSIGNMENT CHANGES (5) AND CLOSEST HAP (10) )
280.000 CALL TRACKER
280.100 RETURN
281.000 C-----
282.000 500 MAXGR = NGR-1
283.000 WRITE(108,870)MAXGR
284.000 870 FORMAT(/14X,27HCLASSIFICATION RANGR RESET:/14X,26(1H-)/
285.000 . 14X,36HMAXIMUM NUMBER OF RAP CLUSTERS . . .,I3/)
286.000 IF(MAXGR.GE,MINGR) GO TO 450
287.000 MINGR=MAXGR
288.000 WRITE(108,875)MINGR
289.000 875 FORMAT(14X,36HMINIMUM NUMBER OF RAP CLUSTERS . . .,I3/)
290.000 IF(MINGR.GE,2) GO TO 1000
291.000 WRITE(108,880)
292.000 880 FORMAT(' **** ERROR - UNABLE TO SPECIFY RAPS ****')
293.000 C (STOP -- TO BE REPLACED BY RETURN CONTINUATION)
294.000 STOP
295.000 END

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1.000      SUBROUTINE FLIPPER(KK,IG,KS)
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      . ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WVAR(15),
4.000      . JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000      . IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      . MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000      COMMON/SCORE/NVAL(20),VAL(12,20),NZ(12,6,20,15),IDISC(20),
9.000      . INDM(20),SCAL(6,20)
10.000     .
11.000 C    VIRTUAL HAP(6,20,2),RHAP(11,21,15),
12.000 C    * ITRACK(2,15),IRES(15,2)
13.000 C -----
14.000 C    IN THE FIRST ITERATION, SR FLIPPER IS CALLED WITH THE
15.000 C    PARAMETERS SET TO (IGRN,KSIGN2), IN EFFECT ADDING EACH
16.000 C    'HAP' AND ADJUSTING THE 'RHAP'. ('IGRN' IS THE RHAP
17.000 C    GROUP ASSIGNED IN RAPPER, AND, KSIGN2= 1)
18.000 C
19.000 C    IN SUCCEEDING ITERATIONS, IF THE ASSIGNED GROUP 'IGRN'
20.000 C    DOES NOT MATCH THE PREVIOUS ASSIGNMENT, SR FLIPPER IS
21.000 C    FIRST CALLED WITH PARAMETERS (IGROUP,KSIGN1), WHERE
22.000 C    'IGROUP' REPRESENTS THE PREVIOUS ITERATIONS GROUP
23.000 C    ASSIGNMENT (AND, KSIGN1 = -1 ), THE 'HAP' IS SUBTRACTED
24.000 C    FROM THE COUNTER AND THE 'RHAP' IS ADJUSTED. SR FLIPPER
25.000 C    IS THEN CALLED AGAIN WITH PARAMETERS (IGRN,KSIGN2), AND
26.000 C    THE 'HAP' IS THEN PROPERLY ASSIGNED AND THE 'RHAP'
27.000 C    ADJUSTED.
28.000 C -----
29.000 C
29.100 X    WRITE(108,4281)KK,IG,KS
29.200 X4281 FORMAT(/' IN FLIP WITH KK,IG,KS =' ,3I5)
30.000      DO 50 J=1,NCHAR
31.000      IF(IDISC(J).EQ.1) GO TO 42
32.000 C
33.000 C    (CONTINUOUS VARIABLES)
34.000      DO 41 I=1,NA
34.100 X    WRITE(108,4282)I,J,IG,RHAP(I,J,IG),MEMB(IG)
34.200 X4282 FORMAT(10X,3I3,F10.4,I5)
35.000      RHAP(I,J,IG)=((RHAP(I,J,IG)*MEMB(IG))
36.000      * + (KS * HAP(I,J,KS)))/(MEMB(IG) + KS)
37.000      41 CONTINUE
38.000      GO TO 50
39.000 C
40.000 C    (DISCRETE VARIABLES)
41.000      42 NNVAL=NVAL(J)
42.000      DO 48 I=1,NA
43.000      DO 44 L=1,NNVAL
44.000      IF(HAP(I,J,KS).EQ.VAL(L,J))NZ(L,I,J,IG)=NZ(L,I,J,IG) + KS
45.000      44 CONTINUE
46.000      45 MAXX=NZ(1,I,J,IG)
47.000      DO 46 L=1,NNVAL
48.000      IF(MAXX.GT.NZ(L,I,J,IG)) GO TO 46
49.000      MAXX=NZ(L,I,J,IG)
50.000      LMAX=L
51.000      46 CONTINUE
51.100 X    WRITE(108,4283)I,J,IG,RHAP(I,J,IG),LMAX,VAL(LMAX,J)
51.200 X4283 FORMAT(10X,3I3,F10.4,I5,I5)
52.000      RHAP(I,J,IG)=VAL(LMAX,J)
53.000      48 CONTINUE
54.000      50 CONTINUE
55.000 C -----
56.000      100 RETURN
57.000      END

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(E XMEMBER
(TY

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1.000      SUBROUTINE MEMBER
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      , ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WVAR(15),
4.000      , JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000      , IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      ,      MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000      DIMENSION ALPH(3,2)
9.000      DATA ALPH/4HNON-,4HINFE,4HRIOR,4H  FE,4HASIB,4HLE  /
10.000 C    VIRTUAL IRESP(15,250)
11.000 C-----
12.000 C      OUTPUT MEMBERSHIP OF REPRESENTATIVE PATTERN
13.000 C-----
14.000 C
15.000 C      RHAP GROUP HEADERS
16.000 C      -----
17.000      WRITE(108,100)
18.000      100 FORMAT(//)
19.000      WRITE(108,110)
20.000      110 FORMAT(3X,10(7H*****)/3X,'*',68X,'*')
21.000      WRITE(108,120)NGR,NITER,N,NA,NCHAR
22.000      120 FORMAT(3X,'* PATTERN RECOGNITION AND CLASSIFICATION',
23.000      * 17X,I2,' GROUPS */3X,'*',68X,'*/3X,'* CONVERGENCE',
24.000      * ' AFTER',I3,' ITERATIONS ON',I4,' PATTERNS.',18X,'*/3X,
25.000      * '* PATTERN DEFINED BY',I3,' PLANNED ACTIVITIES AND',I4,
26.000      * ' CHARACTERISTICS',2X,'*')
27.000      WRITE(108,130)
28.000      130 FORMAT(3X,10(7H*****)/)
29.000 C
30.000 C      MEMBERSHIP COUNTERS
31.000 C      -----
32.000      DO 30 K = 1,NGR
33.000      I=0
34.000      II=2
35.000      IF(NF,NE,15)II=1
36.000      WRITE(108,150)K,MEMB(K),(ALPH(J,II),J=1,3)
37.000      150 FORMAT(/4X,'REPRESENTATIVE PATTERN ',I3,
38.000      * 2X,'(INCORPORATES',I4,1X,3A4,' PATTERNS)')
39.000      WRITE(108,160)
40.000      IF(IOPT(1),NE,1) GO TO 30
41.000      DO 20 J = 1,N
42.000      IF (INUMB(J),NE,K) GO TO 20
43.000      I=I+1
44.000      IORD(I)=J
45.000      20 CONTINUE
46.000      WRITE(108,155)(IORD(JJ),LABEL(IORD(JJ)),JJ=1,I)
47.000      155 FORMAT((5X,5(I5,3H - ,I5)))
48.000      WRITE(108,160)
49.000      160 FORMAT(4X,17(4H----))
50.000      30 CONTINUE
51.000 C-----
52.000      RETURN
53.000      END

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1.000      SUBROUTINE CLONER
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      . ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WVAR(15),
4.000      . JUMP,INT,NGR,NUMB,NITER,NCOL,MFMB(15),FRATIO(15),
5.000      . IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      .      MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000 C    VIRTUAL RHAP(6,20,15)
9.000 C-----
10.000 C    PRODUCES OUTPUT OF PATTERN CENTROIDS ON FILE F:NGRFIL,
11.000 C    WHERE NGRFIL IS THE NUMBER OF REPRESENTATIVE PATTERNS
12.000 C    AT THIS ITERATION (PLUS 30). PRINTER OUTPUT OPTIONAL.
13.000 C-----
14.000      NGRFIL=NGR+30
15.000      WRITE(NGRFIL)NOBSER,N,NA,NGR
16.000      DO 10 KG=1,NGR
17.000 10  WRITE(NGRFIL)((RHAP(I,J,KG),J=1,NCHAR),I=1,NA)
18.000 C
19.000      IF(IOPT(2),NE.1)GO TO 40
20.000      WRITE(108,110)
21.000 110  FORMAT(///2X,9(4H----)/2X,'CENTROIDS OF REPRESENTATIVE',
22.000      * ' PATTERNS'/2X,9(4H----)/)
23.000      WRITE(108,120)(K,K=1,NCOL)
24.000 120  FORMAT(2X,'NA NCHAR',2X,6(I2,10X))
25.000 C
26.000 15  DO 20 I=1,NA
27.000      DO 20 J = 1,NCHAR
28.000 20  WRITE(108,130)I,J,(RHAP(I,J,K),K=1,NCOL)
29.000 130  FORMAT(1X,2I3,6E12.4)
30.000      IF(NGR.LE.6) GO TO 40
31.000      WRITE(108,120)(K,K=NCOL+1,NGR)
32.000      DO 30 I=1,NA
33.000      DO 30 J = 1,NCHAR
34.000 30  WRITE(108,130)I,J,(RHAP(I,J,K),K=NCOL+1,NGR)
35.000 C-----
36.000 40  RETURN
37.000      END

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1.000      SUBROUTINE CRUNCHER
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      . ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WVAR(15),
4.000      . JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000      . IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      .      MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000      COMMON/SCORE/NVAL(20),VAL(12,20),NZ(12,6,20,15),INISC(20),
9.000      .      INOM(20),SCAL(6,20)
9.100      DIMENSION PSSD(50)
10.000 C    VIRTUAL HAP(6,20,250),RHAP(6,20,15)
11.000 C-----
12.000 C    CRUNCHER COMPUTES APPROPRIATE STATISTICS FOR EACH RUN
13.000 C    OF THE ALGORITHM. THE PSEUDO F-RATIOS ARE STORED
14.000 C    AND UTILIZED IN IDENTIFYING THE OPTIMAL NUMBER OF
15.000 C    REPRESENTATIVE ACTIVITY PATTERNS.
16.000 C-----
17.000      BVAR=WSSD=TSSD=0.0
18.000      WVAR(NGR)=0.0
18.100      FRATIO(NGR)=0.0
19.000 C
20.000 C    INITIALIZE 'IORD' ARRAY FOR SSD STORAGE
21.000 C-----
22.000      K=(NGR*NGR+NGR)/2
23.000      DO 10 I=1,K
24.000      10 PSSD(I)=0.0
25.000 C
26.000 C    CALCULATE THE POOLED SUM OF SQUARE DISTANCES (PSSD)
27.000 C-----
28.000      NN=N-1
29.000      DO 50 K=1,NN
30.000      K1=K+1
31.000      DO 50 L=K1,N
32.000      Z=0.0
33.000      DO 30 I=1,NA
34.000      DO 30 J=1,NCHAR
35.000      IF(INOM(J).NE.0) GO TO 25
36.000      DIFF=1.0
37.000      IF(HAP(I,J,K).EQ.HAP(I,J,L)) DIFF=0.0
38.000      GO TO 30
39.000      25 DIFF=HAP(I,J,K)-HAP(I,J,L)
40.000      30 Z=Z + (DIFF/SCAL(I,J))*2
41.000      M=INDEX(INUMB(K),INUMB(L))
42.000      50 PSSD(M)=PSSD(M) + Z
43.000 C
44.000 C    PRODUCE TABLE OF VARIANCE
45.000 C-----
46.000      IF(IOPT(3).NE.1) GO TO 55
47.000      WRITE(108,210)
48.000      210 FORMAT(//2X,33(1H-)/3X,'POOLED SUM OF SQUARED',
49.000      . ' DISTANCES'/2X,33(1H-)//
50.000      1 6X,'REPRESENTATIVE PATTERN'/)
51.000      WRITE(108,220)(K,K=1,NGR)
52.000      220 FORMAT((8X,6(I2,10X)))
53.000      55 DO 60 KG=1,NGR
54.000      K=INDEX(1,KG)
55.000      L=INDEX(KG,KG)
56.000      WSSD=WSSD + PSSD(L)
57.000      WVAR(NGR)=WVAR(NGR) + PSSD(L)/MEMB(KG)
58.000      IF(IOPT(3).EQ.1)WRITE(108,230)KG,(PSSD(J),J=K,L)
59.000      230 FORMAT(I3,6E12.4,/(3X,6E12.4))

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61.000      60 TSSD=TSSD + PSSD(J)
62.000 C
63.000 C      SUMMARY STATISTICS
64.000 C      -----
65.000      TVAR=TSSD/N
66.000      BVAR=TVAR-WVAR(NGR)
67.000      IF(N.GT.NGR)FRATIO(NGR)=(BVAR*(N-NGR))/(WVAR(NGR)*(N-1))
68.000      IF(IOPT(4).NE.1)GO TO 90
69.000      WRITE(108,80)
70.000      80 FORMAT(///2X,6(4H----)/3X,'SUMMARY OF STATISTICS'/
71.000      * 2X,6(4H----)/)
72.000      WRITE(108,85)TSSD,WSSD,TVAR,WVAR(NGR),BVAR,FRATIO(NGR)
73.000      85 FORMAT(5X,'TOTAL SSD                =',E12.4/
74.000      ,      5X,'WITHIN SSD                =',E12.4/
75.000      ,      5X,'TOTAL VARIANCE IN PATTERNS   =',E12.4/
76.000      ,      5X,'POOLED WITHIN GROUP VARIANCE =',E12.4/
77.000      ,      5X,'BETWEEN GROUP VARIANCE      =',E12.4/
78.000      ,      5X,'PSUEDO F-RATIO ;           F =',E12.4)
79.000 C-----
80.000      90 RETURN
81.000      END
82.000      INTEGER FUNCTION INDEX(II,JJ)
83.000      IF(II-JJ)1,1,2
84.000      1 I=II
85.000      J=JJ
86.000      GO TO 3
87.000      2 I=JJ
88.000      J=II
89.000      3 INDEX=(J*J-J)/2+I
90.000      RETURN
91.000      END

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1.000      SUBROUTINE TRACKER
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      . ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WUAR(15),
4.000      . JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000      . IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      . MINHAP(15,15),IQRD(50),INUMB(50),LABEL(50)
8.000      DIMENSION LINE(15),LINE2(12)
9.000      DATA LINE/15*3H---/,LINE2/12*4H----/
10.000 C-----
11.000 C      PRODUCE THE PATTERN ASSIGNMENT CHANGE TABLE
12.000 C-----
13.000      IF(IOPT(5).NE.1) GO TO 55
14.000      WRITE(108,210)NOBSER
15.000      210 FORMAT(1H1//3X,10(7H*****)/3X,'* SUMMARY OF ANALYSIS',
16.000      . 30X,'INDIVIDUAL',I5,3X,'*'/3X,10(7H*****))
17.000      NGROUP=MAXGR-MINGR+1
18.000      WRITE(108,220)
19.000      220 FORMAT(/4X,5(4H----)/4X,'PATTERN CHANGE TABLE'/4X,
20.000      . 5(4H----)//15X,'NUMBER OF'/15X,'REPRESENTATIVE PATTERNS')
21.000      WRITE(108,230)(LINE(I),I=1,NGROUP)
22.000      WRITE(108,240)(K,K=MINGR,MAXGR)
23.000      240 FORMAT(12X,'PATTERN',15I3)
24.000      WRITE(108,230)(LINE(I),I=1,NGROUP)
25.000      230 FORMAT(6X,5(3H---),15A3)
26.000      DO 50 J=1,N
27.000      50 WRITE(108,250)J,LABEL(J),(ITRACK(K,J),K=MINGR,MAXGR)
28.000      250 FORMAT(5X,I4,I10,15I3)
29.000      WRITE(108,230)(LINE(I),I=1,NGROUP)
30.000      55 IF(IOPT(9).NE.2 .OR. IOPT(10).NE.1) GO TO 69
31.000 C-----
32.000 C      OUTPUT TABLE OF HAPS CLOSEST TO EACH RAP
33.000 C-----
34.000      WRITE(108,310)
35.000      310 FORMAT(/2X,11(2H--)/
36.000      . 3X,'HAP ASSIGNMENT TABLE'/2X,11(2H--)//
37.000      . 2X,'* IDENTIFICATION OF PATTERN CLOSEST TO EACH',
38.000      . ' CENTROID *'/)
39.000      NG=(MAXGR-2)*3
40.000      NC=MAXGR
41.000      IF(MAXGR.LE.6) GO TO 60
42.000      NG=12
43.000      NC=6
44.000      60 WRITE(108,320)(LINE2(I),I=1,NG)
45.000      320 FORMAT(2X,I4,2X,6(5H----),12A4)
46.000      WRITE(108,325)(K,K=1,NC)
47.000      325 FORMAT(9X,'REPRESENTATIVE PATTERNS'/
48.000      . 2X,'GROUPS',6(I8,4X))
49.000      WRITE(108,320)(LINE2(I),I=1,NG)
50.000      DO 70 NGR=MINGR,MAXGR
51.000      NN=MIN(NGR,NC)
52.000      70 WRITE(108,330)NGR,
53.000      . (MINHAP(NGR,KG),LABEL(MINHAP(NGR,KG)),KG=1,NN)
54.000      330 FORMAT(2X,I4,2X,6(3X,1H(,I3,1H(,I3,1H)))
55.000      WRITE(108,320)(LINE2(I),I=1,NG)
56.000      IF(MAXGR.LE.6) GO TO 69
57.000      WRITE(108,325)(K,K=NC+1,MAXGR)
58.000      WRITE(108,320)(LINE2(I),I=1,NG)
59.000      DO 80 NGR=MINGR,MAXGR
60.000      IF(NGR.LE.NC)GO TO 80
61.000      WRITE(108,330)NGR,

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64.000 WRITE(108,320)(LINE2(I),I=1,NG)
65.000 C-----
66.000 69 RETURN
67.000 END
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1.000      SUBROUTINE PICKER
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      . ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WVAR(15),
4.000      . JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000      . IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      . MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000 C     VIRTUAL HAP(6,20,250),RHAP(11,21,15)
9.000 C -----
10.000 C    PATTERN RECOGNITION PRODUCES A RANGE OF ALTERNATE
11.000 C    CLASSIFICATION OF REPRESENTATIVE PATTERNS. SR PICKER
12.000 C    SELECTS THAT CLASSIFICATION WHICH MAXIMIZES THE
13.000 C    PSEUDO F-RATIO AND OUTPUTS THE CORRESPONDING PATTERN
14.000 C    CENTROIDS TO FILE F:50/RAPS.
15.000 C -----
16.000 C
17.000 C     SELECT 'BEST' CHOICE SET
18.000 C -----
19.000      NGR=MINGR
20.000      FRATIO(MAXGR+1)=0.0
21.000      DO 10 I=MINGR,MAXGR
22.000      IF(FRATIO(I+1).GT.FRATIO(NGR))NGR=I+1
23.000      10 CONTINUE
24.000      WRITE(108,210)
25.000      210 FORMAT(///3X,5(4H----)/3X,'CHOICE SET SELECTION'/
26.000      * 3X,5(4H----)/)
27.000      WRITE(108,215)
28.000      215 FORMAT(7X,17(3H---)/8X,'PATTERN',4X,'PSEUDO',3X,
29.000      . 'WITHIN GROUP'/9X,'GROUP',5X,'F-RATIO',4X,'VARIANCE'/
30.000      . 7X,17(3H---))
31.000      DO 15 I=MINGR,MAXGR
32.000      IF(I.EQ.NGR)GO TO 14
33.000      WRITE(108,220)I,FRATIO(I),WVAR(I)
34.000      220 FORMAT(10X,I3,2X,2E12.4)
35.000      GO TO 15
36.000      14 WRITE(108,225)I,FRATIO(I),WVAR(I)
37.000      225 FORMAT(10X,I3,2X,2E12.4,2X,'** CHOICE SET **')
38.000      15 CONTINUE
39.000      WRITE(108,230)NGR,NOBSER
40.000      230 FORMAT(7X,17(3H---)//4X,3H***,I3,' GROUP CHOICE SET',
41.000      * ' SELECTED FOR OBSERVATION',I3,4H ***//)
42.000      NCOL=NGR
43.000      IF(NGR.GT.6)NCOL=6
44.000      IF(IOPT(9).NE.2 .OR. IOPT(14).NE.2) GO TO 45
45.000 C
46.000 C     OUTPUT 'HAP' IDENTIFIED AS CLOSEST TO EACH 'RHAP'
47.000 C -----
48.000 C     WRITE(108,250)
49.000 C     250 FORMAT(///3X,12(3H---)/
50.000 C     . 4X,'IDENTIFICATION OF CLOSEST PATTERNS'/3X,12(3H---)/
51.000 C     . 4X,'(SELECTION OF PATTERN WITH MINIMUM'/
52.000 C     . 4X,' DEVIATION FROM THE GROUP CENTROID)'/)
53.000 C     WRITE(108,255)(MINHAP(NGR,KG),KG=1,NCOL)
54.000 C     255 FORMAT(8X,6(I2,10X))
55.000      WRITE(52,FMT1)IOBS,KHHN,KPN,NA,IGLOO,START,END
56.000 C     (INT NOT DETERMINED YET - ADDED AS LAST RECORD)
57.000      WRITE(52,100)N,NA,NCHAR,NGR
58.000      100 FORMAT(10I5)
58.100      NN=NCHAR+NUMB
59.000      DO 30 KG=1,NGR
60.000      30 WRITE(52,120)KG,MINHAP(NGR,KG),
61.000      . ((HAP(I,J,MINHAP(NGR,KG)),J=1,NN),I=1,NA)
62.000      120 FORMAT(2I5,4F3.0,2F5.2,2F6.2,2F3.0,2F5.2,2F5.0,2F3.0/

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64.000 C      (FUTURE OPTIONAL PRINTED OUTPUT)
65.000 C      DO 35 I=1,NA
66.000 C      DO 35 J=1,NCHAR
67.000 C 35  WRITE(108,130)I,J,(HAP(I,J,MINHAP(NGR,KG)),KG=1,NCOL)
68.000 C      IF(NGR.LE.6)GO TO 45
69.000 C      DO 40 I=1,NA
70.000 C      DO 40 J=1,NCHAR
71.000 C 40  WRITE(108,130)I,J,(HAP(I,J,MINHAP(NGR,KG)),KG=NCOL+1,NGR)
72.000 C-----
73.000 C      READ REPRESENTATIVE PATTERN CENTROIDS (RHAP'S) AND
74.000 C      UTILIZE AS 'HAP'S' FOR OBSERVED CHOICE CLASSIFICATION
75.000 C      AND FOR THE SYNTHESIS OF EXPLICIT PATTERNS IF IOPT(9)=1)
76.000 C      (THE ORIGINAL HAPS ARE DISCARDED HERE)
77.000 C-----
78.000      45 NGRFIL=NGR+30
79.000      REWIND NGRFIL
80.000      READ(NGRFIL)NOBSER,N,NA,NGR
81.000      DO 50 KG=1,NGR
82.000 50  READ(NGRFIL)((HAP(I,J,KG),J=1,NCHAR),I=1,NA)
83.000 C-----
84.000 C
85.000 C      * ELEMENT # 4 - SPECIFICATION OF OBSERVED CHOICE
86.000 C-----
87.000      60 INT=0
88.000      IF(IOPT(7).EQ.0) GO TO 63
89.000      IORD(1)=N
90.000      CALL STICKER
91.000      N=IORD(1)
92.000 C
93.000 C      OUTPUT OBSERVED CHOICE ASSIGNMENTS TO F:54
94.000 C-----
95.000      IF(IOPT(7).NE.2) GO TO 62
96.000      WRITE(54,135)IOBS,KHHN,KPN,N,NA,NCHAR,NGR,INT,
97.000      , MINHAP(NGR,INT),(MINHAP(NGR,K),LABEL(MINHAP(NGR,K)),K=1,NGR)
97.100 135  FORMAT(9I5/(16I5))
98.000 C      (WRITE INT TO RAPSMIN FILE F:52)
99.000      62 IF(IOPT(9).EQ.2)WRITE(52,100)INT,MINHAP(NGR,INT)
99.100      GO TO 65
99.200      63 IF(IOPT(9).EQ.2)WRITE(52,140)
99.300 140  FORMAT(2(5H 99))
100.000 C
101.000 C      OUTPUT GROUP CENTROIDS TO F:50
102.000 C-----
103.000      65 IF(IOPT(8).NE.1) GO TO 90
104.000      WRITE(50,FMT1)IOBS,KHHN,KPN,NA,IGLOD,START,END
105.000      WRITE(50,100)N,NA,NCHAR,NGR,INT
106.000      DO 70 KG=1,NGR
107.000 70  WRITE(50,150)KG,(NCHAR,(HAP(I,J,KG),J=1,NCHAR),I=1,NA)
108.000 150  FORMAT(I4,N(F6.2)/(4X,NF6.2))
109.000 C      (ALTERNATE VERTICAL OUTPUT FORMAT)
110.000 C      DO 75 I=1,NA
111.000 C      DO 75 J=1,NCHAR
112.000 C 75  WRITE(50,130)I,J,(HAP(I,J,K),K=1,NCOL)
113.000 C      IF(NGR.LE.6)GO TO 90
114.000 C      DO 80 I=1,NA
115.000 C      DO 80 J=1,NCHAR
116.000 C 80  WRITE(50,130)I,J,(HAP(I,J,K),K=NCOL+1,NGR)
117.000 C-----
118.000      90 RETURN
119.000      END

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1.000      SUBROUTINE STICKER
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      . ICON,NF,N,NA,IOBS,KHHN,KPN,IGLOO,START,END,WVAR(15),
4.000      . JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
5.000      . IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
7.000      . MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
8.000      COMMON/SCORE/NVAL(20),VAL(12,20),NZ(12,6,20,15),IDISC(20),
9.000      . INDM(20),SCAL(6,20)
10.000 C    VIRTUAL HAP(6,20,250),RHAP(11,21,15),
11.000 C    * ITRACK(250,15),IRESF(15,250)
12.000 C    -----
13.000 C    THE SET OF REPRESENTATIVE PATTERNS SELECTED FORM THE
14.000 C    INDIVIDUAL CHOICE SET. SR STICKER ASSIGNS THE OBSERVED
15.000 C    ACTIVITY PATTERN TO THE 'BEST' REPRESENTATIVE PATTERN.
16.000 C    -----
17.000 C    READ THE OBSERVED ACTIVITY PATTERN
18.000 C    -----
19.000      JUMP=1
20.000      IORD(1)=N
21.000      N=NGR+1
22.000      READ(49,FMT1)IOBS,KHHNO,KPNO
23.000      DO 20 I=1,NA
24.000      20 READ(49,FMT4)(HAP(I,J,N),J=1,NCHAR)
25.000      IF(IOPT(13).EQ.0)GO TO 35
26.000 C
27.000 C    * (OPTIONAL OUTPUT OF ACTIVITY PROGRAM)
28.000      WRITE(108,105)
29.000      105 FORMAT(/2X,'** OBSERVED ACTIVITY PROGRAM **'/)
30.000      WRITE(108,FMT1)IOBS,KHHNO,KPNO
31.000      WRITE(108,FMT4)((HAP(I,J,N),J=1,NCHAR),I=1,NA)
32.000      35 IF(KHHN.NE.KHHNO)GO TO 1000
33.000      IF(KPN.NE.KPNO) GO TO 1010
34.000      IORD(2)=MINGR
35.000      IORD(3)=MAXGR
36.000      MINGR=NGR
37.000      MAXGR=NGR
38.000      ICON=1
39.000 C
40.000 C    ASSIGN THE OBSERVED PATTERN
41.000 C    -----
42.000      CALL RAPPER
43.000 C
44.000      WRITE(108,110)NGR
45.000      110 FORMAT(/3X,26(1H-)/3X,'OBSERVED CHOICE ASSIGNMENT'/
46.000      . 3X,26(1H-)/7X,'* FOR',I3,' RHAP CHOICE SET *'/
47.000      . 7X,37(1H-)/
48.000      . 15X,'CLOSEST PATTERN',3X,'OBSERVED'/
49.000      . 9X,'RHAP',2X,15(1H-),4X,'CHOICE'/
50.000      . 17X,'HAP LABEL',4X,'ASSIGNMENT'/7X,37(1H-))
51.000      DO 50 KG=1,NGR
52.000      IF(KG.EQ.INT) GO TO 40
53.000      WRITE(108,120)KG,MINHAP(NGR,KG),LABEL(MINHAP(NGR,KG))
54.000      120 FORMAT(9X,I3,3X,I5,2X,I5)
55.000      GO TO 50
56.000      40 WRITE(108,130)KG,MINHAP(NGR,KG),LABEL(MINHAP(NGR,KG)),KG
57.000      130 FORMAT(9X,I3,3X,I5,2X,I5,5X,'* RHAP',I3,2H *)
58.000      50 CONTINUE
59.000      WRITE(108,140)
60.000      140 FORMAT(7X,37(1H-)//)
61.000      N=IORD(1)
62.000      MINGR=IORD(2)

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63.000

64.000 RETURN

65.000 C-----

66.000 C ERROR MESSAGES

67.000 1000 WRITE(108,1001)KHHND

68.000 1001 FORMAT(//' *** INPUT ERROR ***',

69.000 , 'INCORRECT HOUSEHOLD FOR OBSERVED CHOICE',I6)

70.000 STOP 3

71.000 1010 WRITE(108,1011)KHHND,KPND

72.000 1011 FORMAT(//' *** INPUT ERROR ***',

73.000 , ' INCORRECT PERSON NUMBER ',2I6/20X,'(OBSERVED CHOICE)')

74.000 STOP 4

75.000 C-----

76.000 END

```
1.000      SUBROUTINE MOOGER
2.000      COMMON/INFO/NOBSER,NOBS,NCHAR,MINGR,MAXGR,MAXITR,KARB,
3.000      . ICON,NF,N,NA,IOBS,KHHN,KPN,IGLDD,START,END,WVAR(15),
4.000      . JUMP,INT,NGR,NUMB,NITER,NCOL,MEMB(15),FRATIO(15),
6.000      . IOPT(15),FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000      COMMON/PAT/HAP(6,20,50),RHAP(11,21,15),ITRACK(15,50),
8.000      .      MINHAP(15,15),IORD(50),INUMB(50),LABEL(50)
9.000      DIMENSION ITOT(12),XR(12,21),ZR(12,21)
10.000 C   *** INSERT COORDINATE DATA STATEMENTS ***
11.000 C   *** ACT/A VS XR/ZR ***
12.000 C   -----
13.000 C   SR MOOGER SYNTHESIZES EXPLICIT ACTIVITY PATTERNS
14.000 C   FROM BOTH THE REPRESENTATIVE PATTERN CENTROIDS AND
15.000 C   ACTIVITY TEMPORAL CONSIDERATIONS
16.000 C   -----
17.000 C
18.000 C   SYNTHESIS VARIABLES
19.000 C   -----
20.000 C   SR MOOGER IS PROGRAMMED TO SYNTHESIZE EXPLICIT
21.000 C   REPRESENTATIVE PATTERNS, AND REFLECTS ONLY THE
22.000 C   SPECIFIC VARIABLES SELECTED. ALTERNATIVE SYNTHESIS
23.000 C   NECESSITATES REPROGRAMMING OF SR MOOGER
24.000 C
25.000 C   NCHAR      VARIABLE
26.000 C   -----
27.000 C       1      POSITION IN FULL ACTIVITY PATTERN
28.000 C       2      POSITION IN TOUR
29.000 C       3      NO. OF SOJOURNS IN TOUR
30.000 C       4      TOUR NUMBER
31.000 C       5      TRAVEL TIME TO ACTIVITY
32.000 C       6      WAITING TIME AT ACTIVITY
33.000 C       7      STARTING TIME OF THE ACTIVITY
34.000 C       8      ACTIVITY DURATION
35.000 C       9      MODE USED TO ACTIVITY
36.000 C      10     ACTIVITY FOLLOWED BY A RETURN HOME
37.000 C      11     TRAVEL TIME TO HOME
38.000 C      12     RESULTING DURATION AT HOME
39.000 C      13     SOJOURN LOCATION (NODE)
40.000 C      14     ACTIVITY TYPE
40.100 C          ACTIVITY IMPORTANCE      *** NOT ADDED YET ***
41.000 C      15     UNIQUE ACTIVITY LABEL
42.000 C      16     'X' LOCATION COORDINATE
43.000 C      17     'Y' LOCATION COORDINATE
43.100 C   *** ADJUST FOR NCHAR1, 17TH CHARACTERISTICS *** *** ***
44.000 C
45.000 C   -----
46.000 C
47.000 C   * HEADER OUTPUT
48.000      WRITE(108,200)
49.000      200 FORMAT(///22X,32(1H*)/
50.000      . 22X,1H*,11X,'SYNTHESIS OF',11X,1H*/
51.000      . 22X,1H*,1X,'REPRESENTATIVE ACTIVITY PATTERNS',1X,1H*/
52.000      . 22X,32(1H*)/)
53.000      WRITE(51,500)IOBS,KHHN,KPN,NA,IGLDD,START,END,NGR,INT
54.000      500 FORMAT(5I5,2F7.2,2I5)
55.000 C
56.000 C   PERFORM SYNTHESIS FOR EACH REPRESENTATIVE PATTERN
57.000 C   -----
58.000      DO 100 L=1,NGR
59.000 C
60.000 C   IF...THE RAPPER ALGORITHM ESTIMATES THE POSITION IN THE
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62.000 C
63.000 C ACCOUNT FOR RETURN HOME ACTIVITIES
64.000 C -----
65.000 NCHAR1=NCHAR+1
66.000 ITOTL=0
67.000 DO 20 I=1,NA
68.000 ITOTL=ITOTL+1
69.000 DO 12 J=1,NCHAR
70.000 12 XR(ITOTL,J)=RHAP(I,J,L)
71.000 C * ADD ACTIVITY LABEL
72.000 XR(ITOTL,NCHAR1)=I
73.000 IF(XR(ITOTL,10).NE.1.)GO TO 20
74.000 C
75.000 C * SPECIFY THE RETURN HOME ACTIVITY DATA
76.000 ITOTL=ITOTL+1
77.000 DO 13 J=1,NCHAR1
78.000 13 XR(ITOTL,J)=0.
79.000 XR(ITOTL,1)=XR(ITOTL-1,1)+1.
80.000 XR(ITOTL,5)=XR(ITOTL-1,11)
81.000 XR(ITOTL,8)=XR(ITOTL-1,12)
82.000 XR(ITOTL,9)=XR(ITOTL-1,9)
83.000 XR(ITOTL,13)=IGLOD
84.000 XR(ITOTL,14)=XIG
85.000 XR(ITOTL,15)=YIG
86.000 20 CONTINUE
87.000 ITOT(L)=ITOTL
88.000 C
89.000 C PLACE ACTIVITY ARRAY IN ORDER (BY PERFORMED SEQUENCE)
90.000 C -----
91.000 DO 30 I=1,ITOTL
92.000 IO=XR(I,1)
93.000 DO 30 J=1,NCHAR1
94.000 30 ZR(IO,J)=XR(I,J)
95.000 C
96.000 C TEST 'CLOCK' AND 'EXPENDED' TIME ESTIMATES
97.000 C -----
98.000 S1=0.0;S2=0.0;S3=0.0
99.000 DO 50 K=1,ITOTL
100.000 IF(ZR(K,NCHAR1).EQ.0.) GO TO 50
101.000 S1=0.0
102.000 DO 42 I=1,K
103.000 42 S1=S1+ZR(I,8)+ZR(I,9)
104.000 KM1=K-1
105.000 IF(KM1.EQ.0) GO TO 48
106.000 S2=0.0
107.000 DO 44 I=1,KM1
108.000 44 S2=S2+ZR(I,11)
109.000 48 S3=S3+ZR(K,10)-S1-S2
110.000 50 CONTINUE
111.000 C
112.000 C COMPUTE CONSISTENT START TIMES
113.000 C -----
114.000 XNA=NA
115.000 S0=S3/XNA
116.000 DO 60 I=1,ITOTL
117.000 ZR(I,7)=S0+ZR(I,5)+ZR(I,6)
118.000 S0=ZR(I,7)+ZR(I,8)
119.000 60 CONTINUE
120.000 C
120.100 C OUTPUT SYNTHESIZED ACTIVITY PATTERNS
120.200 C -----
121.000 WRITE(51,510)L,ITOTL,NCHAR1
122.000 510 FORMAT(3I5)
123.000 WRITE(108,210)L
124.000 210 FORMAT(//2X,2A(1H-)/

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126.000      * 2X,26(H-)/
127.000      DO 70 I=1,101L
127.100      WRITE(108,520)I,(ZR(I,J),J=1,9),(ZR(I,J),J=13,17)
128.000      70 WRITE(51,520)I,(ZR(I,J),J=1,9),(ZR(I,J),J=13,17)
129.000      520 FORMAT(5F4.0,4F6.2,2F4.0,2F5.1,2F4.0)
130.000      100 CONTINUE
-----C-----
131.000
132.000      STOP
133.000      END

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1.000 C      SMOOPER - DRIVER PROGRAM - VERSION C      10-6-82
2.000 C
3.000 C-----
4.000 C
5.000 C      CHAINING BEHAVIOR IN URBAN TRIP MAKING
6.000 C
7.000 C      SIMULATION OF COMPLEX TRAVEL BEHAVIOR - VERSION SMOOP:C
8.000 C      OCT.6,1982
9.000 C      III. SMOOP -- IDENTIFICATION OF NON-INFERIOR ACTIVITY
10.000 C      PATTERNS USING MULTI-OBJECTIVE CRITERIA
11.000 C
12.000 C      W.W.RECKER
13.000 C      M.G.MCNALLY
14.000 C      G.S.ROOT
15.000 C
16.000 C      PROGRAMMED BY: M.G.MCNALLY AND G.S.ROOT (11/81)
17.000 C      MODIFIED BY:  MGM B(11/81) C(10/82)
18.000 C-----
18.100      COMMON/CHOP/HITS,NUMB,PRED,NOBS
19.000      COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,0(40,200)
20.000      COMMON/CRIT/ISSET,NNOBJ,KKEY(40),NFILE,ITOT,NINF
21.000      COMMON/RETAIN/KTRACK(200),OB(40,200),INOS,IHOLD
22.000      COMMON/OBJPAR/NOBJ,MOBJ(40),KEY(40),KEY2(40),NF1,NF2,
23.000      K1,K2,K3,K4,K5,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
24.000      COMMON/BANK/N,AH(12),AHH(12),IMP(12),IFREQ(12),KNOW(12),
25.000      LOC(12),M(12),TT(12),TA(12),TI(12),TS(12),TD(12),TF(12)
26.000      DIMENSION TITLE(18),ALPH(3,10)
27.000 C-----
28.000 C      SPECIFICATION OF A NON-INFERIOR PATTERN SET
29.000 C-----
30.000 C      SMOOPER FORMS THE THIRD MODULE OF THE COMPLEX TRAVEL
31.000 C      SIMULATION SYSTEM, AND IS ACCESSED THROUGH VARIOUS
32.000 C      APPROACHES:
33.000 C      (A) SEQUENCE 12345
34.000 C      THE FIVE MAJOR MODULES ACCESSED IN ORDER:
35.000 C      (1) HOUSEHOLD INTERACTION (TROOPER)
36.000 C      (2) FEASIBLE PATTERN GENERATION (SNOOPER)
37.000 C      (3) NON-INFERIOR PATTERN SELECTION (SMOOPER)
38.000 C      (4) PATTERN RECOGNITION/CLASSIFICATION (GROOPER)
39.000 C      (5) HOUSEHOLD PATTERN CHOICE MODEL (CHOOSE)
40.000 C
41.000 C      (B) SEQUENCE 2345
42.000 C      SAME AS 12345 BUT ON AN INDIVIDUAL BASIS
43.000 C
44.000 C      (C) SEQUENCE 2435
45.000 C      REVERSE ORDER OF MODULE 3 AND 4
46.000 C
47.000 C      (D) SEQUENCE 2435 (MODIFIED)
48.000 C      THIS VERSION INITIATES A MODIFIED CHOICE MODEL.
49.000 C      REPRESENTATIVE PATTERNS RESULTING FROM THE
50.000 C      24 MODULE SEQUENCE ARE TESTED WITH VARIOUS
51.000 C      CRITERIA SETS IN MODULE 4 TO ESTABLISH AN
52.000 C      OPTIMAL CRITERIA SET FOR THE CHOICE MODEL.
53.000 C      (THE OPTIMAL SET BEST REPRESENTS THE OBSERVED
54.000 C      CHOICE IN THE NON-INFERIOR PATTERN SET)
55.000 C-----
56.000 C-----
57.000 C      FILE SETS:
58.000 C      INPUT:  F:21 - PARAMETERS (PARSMOOP)
59.000 C      F:15 - FEASIBLE
60.000 C      PATTERN DATA (FEASOUT)
61.000 C      F:16 - FEASIBLE

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63.000 C          F:51 - SYNTHESIZED
64.000 C          REPRESENTED PATTERNS (RAPSSYN)
65.000 C          F:52 - CLOSEST PATTERNS
66.000 C          TO RAP CENTROIDS (RAPSMIN)
67.000 C          F:53 - RAP OBJECTIVES (RAPSOBJ)
67.100 C          F:54 - OBSERVED PATTERNS (RAPSSUM)
68.000 C
69.000 C          OUTPUT: F:22 - NON-INFERIOR
70.000 C          PATTERN DATA (NINFPAT)
71.000 C          F:23 - NON-INFERIOR
72.000 C          OBJECTIVE VALUES (NINFOBJ)
73.000 C          F:24 - SCRATCH FILE
74.000 C-----
75.000 C          PRODUCE OUTPUT HEADER
76.000 C          -----
77.000          WRITE(108,799)
78.000          799 FORMAT(1H1///)
79.000          WRITE(108,800)
80.000          800 FORMAT(
81.000          .12X,52H***** SMOOPER *****/
82.000          .12X,52H*                               */
83.000          .12X,52H*          CHAINING BEHAVIOR IN URBAN TRIP MAKING */
84.000          .12X,52H*                               */
85.000          .12X,52H*          C H A I N S                               */
86.000          .12X,52H*                               */
87.000          .12X,52H* Complex Household Activity Interaction Simulator */
88.000          .12X,52H*                               */
89.000          .12X,52H*          Module # 3 -- SMOOPER                       */
90.000          .12X,52H*          (Version SMOOP:C   Oct.6,1982)             */
91.000          .12X,52H*                               */
92.000          .12X,52H*          Multi-objective Identification of         */
93.000          .12X,52H*          Non-inferior Travel/Activity Patterns     */
94.000          .12X,52H*                               */
95.000          .12X,52H*          W.W.RECKER M.G.MCNALLY G.S.ROOT           */
96.000          .12X,52H*                               */
97.000          .12X,52H***** SMOOPER *****/
103.000 C-----
104.000 C          PROGRAM TESTS FOR PATTERN NON-INFERIORITY USING
105.000 C          SUBSETS OF CALCULATED MULTI-OBJECTIVE CRITERIA
106.000 C-----
107.000 C          OPTIONS:
108.000 C          -----
109.000 C          (1) TESTS BY SPECIFIED OBJECTIVE SETS (K3.EQ.0)
110.000 C          (2) GENERATION OF OPTIMAL OBJECTIVE SET (K3.NE.0)
111.000 C          (MAXIMIZES PRESENCE OF OBSERVED CHOICE
112.000 C          IN THE NON-INFERIOR PATTERN SET)
113.000 C
114.000 C-----
115.000 C          VARIABLES:
116.000 C          -----
117.000 C          K5 = MAXIMUM NUMBER OF OBJECTIVES FOR ANALYSIS
118.000 C          NNOBJ = TOTAL NUMBER OF CALCULATED OBJECTIVE
119.000 C          VALUES (NOBJ IN SNOOPER) [ MAX =40 ]
120.000 C          NOBJ = NUMBER OF OBJECTIVES SELECTED FOR ANALYSIS
121.000 C          KEY(I) = IDENTIFIES SELECTED OBJECTIVES
122.000 C          (KEY(I)=1 if selected, 0 if not; for I=1,40)
123.000 C          MOBJ(I) = IDENTIFIES OBJECTIVE OPTIMIZATION
124.000 C          (1=maximize, 0=minimize)
125.000 C          KEY2(I) = SEQUENTIAL COUNTER FOR NOBJ IN SMOOPER
126.000 C          KKEY(I) = SET FOR ANY INDIVIDUAL (KEY2(I) IN SNOOPER)
127.000 C
128.000 C          PARAMETERS:
129.000 C          -----
130.000 C          TITLE - ALPHANUMERIC TITLE FOR JOB

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132.000 C   NF2      - LOGICAL UNIT FOR INPUT PATTERNS
133.000 C   K1 (=1)  - PRINTED PATTERN OUTPUT (0=DON'T)
134.000 C   K2 (=1)  - PRINTED CRITERIA OUTPUT (0=DON'T)
135.000 C   K3      - IF(K3.NE.0), FIND BEST CRITERIA SET
136.000 C           WHERE K3 IS THE TOTAL NUMBER OF CRITERIA
137.000 C   K4 (=1)  - PRODUCE HEADER FOR CHOSEN CRITERIA
138.000 C   K5      - MAXIMUM NUMBER OF OBJECTIVES
138.100 C   K6 (=1)  - COMPUTE RAP OBJECTIVES
139.000 C   VARIABLE FORMATS:
140.000 C   -----
141.000 C   FMT1     - I/O FORMAT FOR STANDARD INDIVIDUAL HEADER
142.000 C   FMT2     - I/O FORMAT FOR
143.000 C   FMT3     - I/O FORMAT FOR
144.000 C   FMT4     - I/O FORMAT FOR
145.000 C   -----
146.000     1 ISET=0
147.000     READ(21,100)(TITLE(I),I=1,20)
148.000    100 FORMAT(20A4)
149.000     WRITE(108,102)(TITLE(I),I=1,18)
150.000    102 FORMAT(//2X,19(4H----)/4X,18A4/2X,19(4H----))
151.000     WRITE(108,810)
152.000    810 FORMAT(//4X,'FILE OUTPUT:'/9X,'NINFPAT - NON-INFERIOR'
153.000     *, ' PATTERN SPECIFICATION DATA (F:22)'/9X,'NINFOBJ -'
154.000     *, ' NON-INFERIOR PATTERN OBJECTIVE VALUES (F:23)'/)
155.000 C
156.000 C   READ CONTROL PARAMETERS:
157.000 C   -----
158.000     READ(21,105)NF1,NF2,K1,K2,K3,K4,K5,K6
159.000    105 FORMAT(10I5)
160.000     IF(NF1.EQ.0)NF1=16
161.000     IF(NF2.EQ.0)NF2=15
161.100 C
161.200 C   OPTIONAL COMPUTATION OF PATTERN OBJECTIVES
161.300 C   -----
161.400     IF(K6.EQ.1) CALL BLOOPER
162.000 C
163.000 C   READ CONTROL FORMATS:
164.000 C   -----
165.000     READ(21,107)(FMT1(I),I=1,20)
167.000    107 FORMAT(20A4)
168.000 C   -----
169.000 C   READ A DESIRED CRITERIA SET:
170.000 C   -----
171.000     10 READ(21,110,END=69)(KEY(I),I=1,K5)
172.000     READ(21,110)(NOBJ(I),I=1,K5)
173.000    110 FORMAT(40I2)
174.000     ISET =ISET+1
175.000     NOBJ=0
176.000     J=1
177.000     DO 20 I=1,K5
178.000     IF(KEY(I).NE.1)GO TO 20
179.000     NOBJ=NOBJ+KEY(I)
180.000     KEY2(J)=I
181.000     J=J+1
182.000     20 CONTINUE
183.000 C   -----
184.000 C   EXECUTE OPTION
185.000 C   -----
186.000     IF(K3.NE.0)GO TO 50
187.000 C
188.000 C   PERFORM TESTS OF ALTERNATE OBJECTIVE SETS
189.000 C   -----
190.000     CALL SPLITTER
191.000 C

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194.000      GO TO 10
195.000      69 WRITE(108,320)ISET
196.000      320 FORMAT(' ANALYSIS COMPLETED FOR',I3,' CRITERIA SETS'//) 66
197.000 C
198.000      STOP 1
199.000 C
200.000 C      SYSTEMATIC GENERATION OF OBJECTIVE SET
201.000 C      -----
202.000 C      (BASED ON PRESENCE OF OBSERVED CHOICE IN THE RESULTING
203.000 C      NON-INFERIOR OBJECTIVE SET)
204.000 C
205.000 C      40 NOBJ=K3
206.000      50 WRITE(108,820)NOBJ
207.000      820 FORMAT(//3X,50(1H-)/
208.000      , 3X,' SPECIFICATION OF CRITERIA SET - ',I3,' OBJECTIVES'//
209.000      , 3X,50(1H-)/)
210.000      CALL CHOPPER
211.000 C
212.000      STOP 2
213.000 C-----
214.000      END
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*

SUBROUTINE BLOOPER

PROGRAMMED BY G.S.ROOT AND M.G.MCNALLY (1982)
MODIFIED BY M.G.MCNALLY (1/83)

THIS PROGRAM CALCULATES THE VALUES OF THE ACTIVITY
PATTERN DECISION VARIABLES(OBJECTIVES)

COMMON/HOUSE/ITP,T(20),IHHSIZE(20),KF
COMMON/VALUE/IMP(15),MODE(16)
COMMON/TIME/TT(15),TA(15),TS(15),TD(15),TF(15),FT(10)
COMMON/ZONE/KLOC,LOC(15),NL(10),DIS(10,10)
COMMON/IDLE/TI(15)
COMMON/FLEX/IGLOO,START,END,MAP(66),LAP(276),KAP(276),
DIST(221),CDIS(55),DF(10,5),AF(5),DUR(5),BT(5),ET(5)
COMMON/WHICH/TRACK,WHO(15),NGR,LD,LOPT(10)
COMMON/PERSON/IORS
INTEGER WHO,WHOM
LOGICAL LOPT

CODE THE GEOGRAPHICAL AREA

DATA (LAP(L),L=1,276)/37*304,15*319,35*320,41*323,
33*329,38*330,18*333,16*335,
*
* 18*340,25*342/
DATA (MAP(L),L=1,17)/203,208,209,210,211,212,214,216,
217,218,219,221,224,226,227,228,
*
* 229/
DATA (MAP(L),L=18,22)/403,405,406,411,413/
DATA (MAP(L),L=23,40)/601,602,604,605,606,607,608,609,
611,612,613,614,616,617,618,619,
*
* 620,621/
DATA (MAP(L),L=41,53)/701,702,703,704,705,706,707,708,
709,710,711,712,713/
*
* DATA (MAP(L),L=54,66)/801,802,803,804,805,806,807,808,
809,810,811,812,814/
*
* DATA (KAP(L),L=1,276)/37*1,15*2,35*3,41*4,33*5,38*6,
18*7,16*8,18*9,25*10/
*

46,000 C
47,000 C INPUT;
F: 1 MODULE PARAMETERS
F: 2 CENTROID TRAVEL TIMES
F: 3 TOWN TRAVEL TIMES
F: 5 INDIVIDUAL HOME TRANSITIONS
F: 6 INDIVIDUAL TRAVEL TIMES
F: 7 INDIVIDUAL ACTIVITY PROGRAM
F: 8 INDIVIDUAL ACTIVITY PATTERNS
F: 54 GROOPER RESULTS (MINMAP,S)
(RAPSASS)
()
(ACTLISTX)
(TIMEX)
(ATHOMEX)
(CONNRDND)
(CENTROND)
(PARBLOOP)

48,000 C
49,000 C
50,000 C
51,000 C
52,000 C
53,000 C
54,000 C
55,000 C
56,000 C
57,000 C
58,000 C
59,000 C
60,000 C
61,000 C
F: 9 OBJECTIVE OUTPUT FILE
F: 10 PATTERN OUTPUT FILE
F: 11 OUTPUT FOR LOGIT INPUT
F: 108 PRINTED OUTPUT
(LOGOUT)
(PLOTOUT)
(OBJOUT)

41,000 C
42,000 C
43,000 C
44,000 C
45,000 C
46,000 C
47,000 C
48,000 C
49,000 C
50,000 C
51,000 C
52,000 C
53,000 C
54,000 C
55,000 C
56,000 C
57,000 C
58,000 C
59,000 C
60,000 C
61,000 C

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63.000 C -----
64.000 C     INPUT PARAMETER DATA FILE:
65.000 C     -----
66.000 C
67.000 C (0) INPUT RUN PARAMETERS
68.000 C
69.000     READ(1,111)(LOPT(L),L=1,10)
70.000 111  FORMAT(3X,10L2)
71.000 C     -----
72.000 C     LOPT(1)=T  OUTPUT OBJECTIVE FILE   (F:9)
73.000 C     LOPT(2)=T  OUTPUT PATTERN FILE   (F:10)
74.000 C     LOPT(3)=T  PRINT PATTERN DATA
75.000 C     LOPT(4)=T  PRINT OBJECTIVES
76.000 C     LOPT(5)=T  PRINT BACK INPUT PARAMETERS
77.000 C     LOPT(6)=T  OUTPUT LOGIT INPUT FILE (MAP-LOGIT)
78.000 C     -----
79.000 C
80.000 C (1) INPUT THE DESTINATION(TOWN) CHOICE PROBABILITIES
81.000 C
82.000 33  DO 10 K=1,10
83.000     READ(1,110)KARD,(DP(K,L),L=1,5)
84.000     IF(LOPT(5))WRITE(108,115)KARD,(DP(K,L),L=1,5)
85.000 115  FORMAT(3X,I3,5F10.4)
86.000 10  CONTINUE
87.000 110  FORMAT(I1,5F10.4)
88.000 C
89.000 C (2) INPUT THE ACTIVITY CHOICE PROBABILITIES
90.000 C
91.000     READ(1,110)KARD,(AP(L),L=1,5)
92.000     IF(LOPT(5))WRITE(108,115)KARD,(AP(L),L=1,5)
93.000 C
94.000 C (3) INPUT THE ACTIVITY DURATIONS
95.000 C
96.000     READ(1,110)KARD,(DUR(L),L=1,5)
97.000     IF(LOPT(5))WRITE(108,115)KARD,(DUR(L),L=1,5)
98.000 C
99.000 C (4) INPUT THE ACTIVITY AVAILABILITY VECTORS
100.000 C
101.000     READ(1,110)KARD,(RT(L),L=1,5)
102.000     IF(LOPT(5))WRITE(108,115)KARD,(BT(L),L=1,5)
103.000     READ(1,110)KARD,(ET(L),L=1,5)
104.000     IF(LOPT(5))WRITE(108,115)KARD,(ET(L),L=1,5)
105.000 C
106.000 C (5) READ ACTIVITY IMPORTANCE MODE
107.000 C
108.000     READ(1,117)KARD,(MODE(I),I=1,16)
109.000     IF(LOPT(5))WRITE(108,116)KARD,(MODE(L),L=1,16)
110.000 116  FORMAT(3X,I3,2X,16I2)
111.000 117  FORMAT(I1,2X,16I2)
112.000 C
113.000 C -----
114.000 C     INPUT THE CENTROID TRAVEL TIME MATRIX
115.000 C     -----
116.000     READ(2,100,END=69)(CDIS(K),K=1,55)
117.000 100  FORMAT(16F5.1)
118.000 C
119.000 C     INPUT THE TOWN TRAVEL TIME MATRIX
120.000 C     -----
121.000 32  READ(3,100,END=69)(DIST(K),K=1,2211)
122.000 C -----
123.000 C     OUTPUT IDENTIFICATION HEADER
124.000     WRITE(108,200)
125.000 200  FORMAT(1H1//)
126.000     WRITE(108,800)
127.000 800  FORMAT(

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128.000 .12X,52H***** BLOOPER *****/
129.000 .12X,52H* */
130.000 .12X,52H* CHAINING BEHAVIOR IN URBAN TRIP MAKING */
131.000 .12X,52H* */
132.000 .12X,52H* C H A I N S */
133.000 .12X,52H* */
134.000 .12X,52H* Complex Household Activity Interaction Simulator */
135.000 .12X,52H* */
136.000 .12X,52H* Module # 3B -- BLOOPER */
137.000 .12X,52H* (Version BLOOPER Jan.,1983) */
138.000 .12X,52H* */
139.000 .12X,52H* Computation of Individual Choice Set */
140.000 .12X,52H* Activity Pattern Decision Objectives */
141.000 .12X,52H* */
142.000 .12X,52H* W.W.RECKER M.G.MCNALLY G.S.ROOT */
143.000 .12X,52H* */
144.000 .12X,52H***** BLOOPER *****/
145.000 C-----
146.000 C
147.000 C ACCESS MAIN OBJECTIVE COMPUTATION ROUTINE
148.000 C -----
149.000 C CALL CIPHER
150.000 C
151.000 WRITE(108,505)
152.000 505 FORMAT(///1X,'END OF ANALYSIS')
153.000 RETURN
154.000 C-----
155.000 69 WRITE(108,108)
156.000 108 FORMAT(/// *** ERROR ON INPUT DATA (READER) ***'//)
157.000 END

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1.000 C *****
2.000 SUBROUTINE CIPHER
3.000 C *****
4.000 C
5.000 C MAIN OBJECTIVE CALLING ROUTINE
6.000 C
7.000 C *****
8.000 COMMON/OBJECT/N,JOBN,D(15),HH(20),H(15)
9.000 COMMON/HOUSE/ITP,T(20),IHHSIZE(20),KP
10.000 COMMON/VALUE/IMP(15),MODE(16)
11.000 COMMON/TIME/TT(15),TA(15),TS(15),TD(15),TF(15),FT(10)
12.000 COMMON/ZONE/KLOC,LOC(15),NL(10),DIS(10,10)
13.000 COMMON/IDLE/II(15)
14.000 COMMON/FLEX/IGLOO,START,END,MAP(66),LAP(276),KAP(276),
15.000 *DIST(2211),CDIS(55),DP(10,5),AP(5),DUR(5),BT(5),ET(5)
16.000 COMMON/WHICH/ITRACK,WHO(15),NGR,ID,LOPT(10)
17.000 COMMON/PERSON/IOBS
18.000 INTEGER WHO,WHOM
19.000 LOGICAL LOPT
20.000 C
21.000 DIMENSION MINHAP(15),IFREQ(15),KNOW(15),M(15),TH(15)
22.000 C -----
23.000 C INPUT INDIVIDUAL DATA REQUIREMENTS
24.000 C
25.000 3 KP=1
26.000 C
27.000 C * INPUT FEASIBLE ACTIVITY PATTERN IDENTIFICATION
28.000 C -----
29.000 C (INDIVIDUALS CHOICE SET FROM GROOPER)
30.000 C
31.000 IERR=54
32.000 READ(54,299,END=999)IOBS,KHHN,KPN,NP,NA,NCHAR,NGR,INT,ICHOSE
33.000 299 FORMAT(9I5)
34.000 READ(54,300)(MINHAP(KG),KG=1,NGR)
35.000 300 FORMAT(8(I5,5X))
36.000 C
37.000 C * INPUT HOME OCCUPANCY TRANSITION POINTS
38.000 C -----
39.000 IERR=5
40.000 READ(5,118)IHHN,T(KP),IHHSIZE(KP),ITP
41.000 IF(IHHN.NE.KHHN) GO TO 69
42.000 11 KP=KP+1
43.000 READ(5,118)IHHN,T(KP),IHHSIZE(KP),ITP
44.000 118 FORMAT(15,2X,F7.2,2X,15,2X,15)
45.000 IF(IHHN.NE.9999)GO TO 11
46.000 KP=KP-1
47.000 C
48.000 C INPUT INDIVIDUAL ACTIVITY PROGRAM PARAMETERS
49.000 C -----
50.000 IERR=7
51.000 READ(7,150)ISEQ,IHHN,IPN,NFILE,IGLOO,START,END
52.000 150 FORMAT(5I5,2F7.2)
53.000 IF(IHHN.NE.KHHN .OR. IPN.NE.KPN) GO TO 69
54.000 DO 33 I=1,NFILE
55.000 READ(7,155)FT(I)
56.000 155 FORMAT(14X,F7.2)
57.000 33 CONTINUE
58.000 DO 34 I=1,NFILE+1
    00 READ(7,156)
    00 156 FORMAT(1X)
    00 34 CONTINUE
    00 C

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130.000      NDBJ=15
131.000      IF(LOPT(6))WRITE(11,305)NGR,NDBJ
132.000 C-----
133.000 C      START GRAND LOOP
134.000 C-----
135.000      WRITE(108,112)NGR,NP
136.000      112 FORMAT(/3X,'** OBJECTIVES WILL BE COMPUTED FOR',I4,
137.000      , ' REPRESENTATIVE PATTERNS'/
138.000      , 6X,'(BASED ON',I5,' FEASIBLE PATTERNS)'/)
139.000      DO 200 ID=1,NGR
140.000 C
141.000 C      LOCATE THE DESIRED FEASIBLE ACTIVITY SCHEDULE
142.000 C
143.000      CALL FINDER
144.000 C
145.000 C      READ ACTIVITY SCHEDULE DATA
146.000 C-----
147.000      IF(LOPT(2))WRITE(10,304)IOBS,KHHN,KPN,ITRACK,N,ICH,ICHOSE
148.000      306 FORMAT(10I5)
149.000      IF(ICHOSE.EQ.MINHAP(ID))WRITE(108,104)ICHOSE
150.000      104 FORMAT(/13X,'*** PATTERN',I5,' CLOSEST TO OBSERVED ***')
151.000      WRITE(108,105)KHHN,KPN,ID,ITRACK
152.000      105 FORMAT('/ HOUSEHOLD',I5,' INDIVIDUAL',I5,11X,'RAP',
153.000      , I5,' FEASIBLE PATTERN ',I4/1X,19(4H----),2H--)
154.000      IF(LOPT(3)) WRITE(108,110)
155.000      110 FORMAT(' I I',5X,'ACTIVITY',6X,' I TRAVEL I',6X,'TEMPORAL',
156.000      , ' SPECIFICATIONS I TIMEI'/' I I',19(1H-),1HI,10(1H-),
157.000      , 1HI,35(1H-),7HI FROMI/' I I', 'NO TP IM FR KN ZONEIMODE',
158.000      , ' TIMEIARRIVAL IDLE START LENGTH FINISHI HOMEI'/' I',
159.000      , 25(3H---),2H-1)
160.000 C
161.000      DO 65 J=1,N
162.000      READ(8,307)J,H(J),HH(J),IMP(J),IFREQ(J),KNOW(J),LOC(J),
163.000      *M(J),TT(J),TA(J),TI(J),TS(J),TD(J),TF(J)
164.000      307 FORMAT(2X,I2,2X,F2.0,F3.0,3I3,2(I4,1X),F5.2,2X,5F7.2)
165.000 C
166.000 C      COMPUTE TRAVEL TIME FROM HOME FOR PLOTTING
167.000 C-----
168.000 C      IF(.NOT.LOPT(2)) GO TO 64
169.000      DO 62 K=1,KLOC
170.000      IF(LOC(J).NE.NL(K)) GO TO 62
171.000 C      * (TRAVEL TIME IN MINUTES FOR PLOT SCALING)
172.000      TH(J)=DIS(K,IG)
173.000      IF(HH(J).EQ.16)TH(J)=0.0
174.000      GO TO 63
175.000      62 CONTINUE
176.000      63 RIMP=IMP(J)
177.000      RFREQ=IFREQ(J)
178.000      RKNOW=KNOW(J)
179.000      RLLOC=LOC(J)
180.000      RM=M(J)
181.000      WRITE(10,400)J,H(J),HH(J),RIMP,RFREQ,RKNOW,RLLOC,RM,
182.000      , TT(J),TA(J),TI(J),TS(J),TD(J),TF(J),TH(J)
183.000      400 FORMAT(2(2X,F2.0),4F3.0,2(F4.0,1X),F5.2,2X,5F7.2,F7.2)
184.000      64 IF(LOPT(3))WRITE(108,308)J,H(J),HH(J),IMP(J),IFREQ(J),KNOW(J),
185.000      , LOC(J),M(J),TT(J),TA(J),TI(J),TS(J),TD(J),TF(J),TH(J)
186.000      308 FORMAT(' I',I2,' I',I2,4I3,I4,' I',I3,F6.2,' I',5F7.2,
187.000      , ' I',F5.2,' I')
188.000      65 CONTINUE
189.000      IF(LOPT(3))WRITE(108,309)
190.000      309 FORMAT(1X,19(4H----),2H--)
191.000 C
192.000 C      CALCULATION OF OBJECTIVE VALUES
193.000 C-----
194.000      IORRN=0

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64.000 C -----
65.000 IERR=6
66.000 READ(6,135)IHNN,IPN,KLOC
67.000 135 FORMAT(14,2I2)
68.000 IF(IHNN.NE,KHHN .OR. IPN.NE,KPN) GO TO 69
69.000 READ(6,140)(NL(K),K=1,KLOC)
70.000 140 FORMAT(16I5)
71.000 DO 20 KI=1,KLOC
72.000 IF(NL(KI).NE,IGLOO) GO TO 20
73.000 IG=KI
74.000 GO TO 24
75.000 20 CONTINUE
76.000 WRITE(108,690)KHHN,KPN
77.000 690 FORMAT(/ /3X,34H*** ERROR - IGL00 NOT FOUND FOR HH,I5)
78.000 STOP 6
79.000 24 DO 25 KI=1,KLOC
80.000 READ(6,145)(DIS(KI,KJ),KJ=1,KLOC)
81.000 145 FORMAT(16F5.1)
82.000 25 CONTINUE
83.000 C -----
84.000 C
85.000 C ARRANGE THE MINHAPS IN ASCENDING ORDER
86.000 C
87.000 DO 15 II=1,NGR-1
88.000 III=II+1
89.000 DO 15 JJ=III,NGR
90.000 IF(MINHAP(JJ).GE,MINHAP(II))GO TO 15
91.000 HAPSAVE=MINHAP(II)
92.000 MINHAP(II)=MINHAP(JJ)
93.000 MINHAP(JJ)=HAPSAVE
94.000 15 CONTINUE
95.000 C
96.000 C WRITE REARRANGED LIST OF MINHAPS(ASCENDING ORDER)
97.000 C
98.000 X WRITE(108,300)(MINHAP(KG),KG=1,NGR)
99.000 C
100.000 DO 70 K=1,NGR
101.000 WHO(K)=MINHAP(K)
102.000 IF(ICHOSE.EQ,MINHAP(K))ICH=K
103.000 70 CONTINUE
104.000 C -----
105.000 C BEGIN INPUT OF ACTIVITY PATTERNS: INDIVIDUAL HEADER
106.000 C -----
107.000 IERR=8
108.000 READ(8,305)IOBS,IHNN,IPN,NFILE,IGLOO,START,END
109.000 305 FORMAT(5I5,2F7.2,I5)
110.000 IF(IHNN.NE,KHHN .OR. IPN.NE,KPN) GO TO 69
111.000 WRITE(108,310)KHHN,KPN,NFILE,IGLOO,START,END
112.000 310 FORMAT(1H1//1X,34(1H*)/
113.000 , ' * HOUSEHOLD ',I5,16X,1H*/1X,34(1H*)/
114.000 , ' * INDIVIDUAL ',I5,16X,1H*// ' * PLANNED ACTIVITIES ',
115.000 , I7,4X,1H*// ' * HOME LOCATION ',5X,I7,4X,1H*/
116.000 , ' * TRAVEL DAY START ',5X,F7.2,1X,1H*/
117.000 , ' * TRAVEL DAY END ',7X,F7.2,1X,1H*/1X,34(1H*)//)
118.000 C
119.000 ROBS=IOBS
120.000 RHNN=KHHN
121.000 RN=NFILE
122.000 RIGLOO=IGLOO
123.000 RNGR=NGR
124.000 RPN=KPN
125.000 IF(LOPT(1))WRITE(9,305)IOBS,KHHN,KPN,NFILE,IGLOO,START,END,NGR
126.000 IF(LOPT(2))WRITE(10,304)ROBS,RHNN,RPN,RN,RIGLOO,START,END,RNGR
127.000 IF(LOPT(6))WRITE(11,305)IOBS,KHHN,KPN,NFILE,IGLOO,START,END,NGR

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196.000      CALL CRITER
197.000 C
198.000 C      (CRITER ACCESSES: MOVER, WAITER, HOMER, FAKER, RISKER)
199.000 C -----
200.000 C
201.000 C      CALCULATION COMPLETE -- OUTPUT OBJECTIVE VALUES
202.000 C -----
203.000      IF(LOPT(1))WRITE(9,306)IOBS,KHNN,KPN,ITRACK,N,ICH,ICHOSE
204.000      IS=0
205.000      IF(ID,EQ,ICH)IS=1
206.000      IF(LOPT(1)) WRITE(9,401)IS,(O(L),L=1,JOBN)
207.000 401  FORMAT(15,5X,7E10.3/(8E10.3))
208.000 C
209.000      IF(LOPT(6)) WRITE(11,401)IS,(O(L),L=1,JOBN)
210.000 C
211.000 190 IF(,NDT,LOPT(4)) GO TO 200
212.000      WRITE(108,405)ITRACK
213.000 405 FORMAT(/3X,7HPATTERN,I4,12H OBJECTIVES/3X,25(1H-))
214.000      WRITE(108,410)(O(L),L=1,JOBN)
215.000 410 FORMAT(4X,12HTRAVEL TIME ,5E12.4/4X,12HWAIT TIME ,E12.4/
216.000      , 4X,12HTIME AT HOME,3E12.4/4X,12HPOTENTIAL ,2E12.4/
217.000      , 4X,12HPATTERN RISK,4E12.4/)
218.000 C
219.000 200 CONTINUE
220.000 C -----
221.000 C      END OF GRAND LOOP
222.000 C -----
223.000      IF(LOPT(2))WRITE(10,320)
224.000 320 FORMAT(' 9999.00')
225.000 C
226.000 C      READ ALL OF THE REMAINING FEASIBLE ACTIVITY SCHEDULES
227.000 C      FOR THE INDIVIDUAL BEING ANALYZED
228.000 C
229.000      CALL SKIPPER
230.000 C
231.000      GO TO 3
232.000 999 RETURN
233.000 C -----
234.000      69 WRITE(108,1000)IERR
235.000 1000 FORMAT(/3X,'*** INPUT ERROR ON FILE',I4,5H ***/)
236.000      END

```

*E XFINDER
*TY

```

1.000 C *****
2.000 SUBROUTINE FINDER
3.000 C *****
4.000 C THIS PROGRAM SEARCHES THROUGH THE SET OF FEASIBLE
5.000 C ACTIVITY SCHEDULES(FEASOUT)AND LOCATES THE SCHEDULES
6.000 C THAT COMPRISE THE INDIVIDUALS CHOICE SET(MINHAP'S)
7.000 C *****
9.000 COMMON/OBJECT/N,JOBN,O(15),HH(20),H(15)
10.000 COMMON/WHICH/ITRACK,WHO(15),NGR,ID,LOFT(10)
11.000 C
12.000 DIMENSION WHOM(15)
14.000 INTEGER WHO,WHOM,WH
15.000 WHOM(ID)=WHO(ID)-1
16.000 20 READ(8,100,END=39)ITRACK,N
17.000 100 FORMAT(15X,2I5)
18.000 C
19.000 C IS PRESENT PATTERN A MINHAP? (IF SO,RETURN)
19.100 C * (2/24/83 CHANGE '1' TO 'ITRACK' IN NEXT LINE)
20.000 IF(WHO(ID).EQ.ITRACK)GO TO 40
21.000 IF(ID.EQ.1)GO TO 31
22.000 WH=WHO(ID-1)+1
23.000 IF(WHO(ID).EQ.WH)GO TO 40
24.000 C
25.000 C IS NEXT PATTERN A MINHAP? (IF SO,LOOP AND RETURN)
26.000 31 IF(ITRACK.EQ.WHOM(ID))GO TO 10
27.000 CALL LOOPER
28.000 GO TO 20
29.000 C
30.000 10 CALL LOOPER
31.000 READ(8,100,END=39)ITRACK,N
32.000 40 RETURN
33.000 39 WRITE(108,210)
34.000 210 FORMAT(1X,'???????????????????? ERROR EOF ON UNIT 8')
35.000 STOP
36.000 END

```

*
*E XLOOPER
*TY

```

1.000 C *****
2.000 SUBROUTINE LOOPER
3.000 C *****
5.000 COMMON/OBJECT/N,JOBN,O(15),HH(20),H(15)
7.000 DO 10 I=1,N
8.000 READ(8,100)
9.000 100 FORMAT(1X)
10.000 10 CONTINUE
11.000 RETURN
12.000 END

```

*
*E XSKIPPER
*TY

```

1.000 C *****
2.000 SUBROUTINE SKIPPER
3.000 C *****
5.000 COMMON/PERSON/IOBS
7.000 10 READ(8,100,END=29)IOBS
8.000 100 FORMAT(I5)
9.000 IF(IOBS.EQ.9999)RETURN
10.000 GO TO 10
11.000 29 WRITE(108,210)
12.000 210 FDMAT(1X,'*****ERROR EOF ON UNIT 12')
13.000 STOP

```

*E XMOVER
*TY

```

1.000 C *****
2.000 SUBROUTINE MOVER
3.000 C *****
4.000 C THIS PROGRAM CALCULATES THE AMOUNT OF TIME SPENT
5.000 C TRAVELING TO ACTIVITIES. THE TRAVEL TIME IS CATE-
6.000 C GORIZED BASED ON THE FOLLOWING ACTIVITY IMPORTANCE
7.000 C CATEGORIES:
8.000 C (1)VERY IMPORTANT
9.000 C (2)IMPORTANT
10.000 C (3)RELATIVELY UNIMPORTANT
11.000 C (4)UNIMPORTANT
12.000 C (5)UNKNOWN(DISCRETIONARY HOME ACTIVITIES)
13.000 C *****
14.000 C
15.000 COMMON/OBJECT/N,JOBN,O(15),HH(20),H(15)
16.000 COMMON/VALUE/IMP(15),MODE(16)
17.000 COMMON/TIME/TT(15),TA(15),TS(15),TD(15),TF(15),FT(10)
18.000 C
19.000 DIMENSION O(5)
20.000 C-----
21.000 DO 5 K=1,5
22.000 5 O(K)=0.00
23.000 C
24.000 DO 30 J=1,N
25.000 IF(J.EQ.N)GO TO 8
26.000 IF(HH(J).NE.16.0)GO TO 15
27.000 IF(H(J).EQ.0.0)GO TO 10
28.000 8 O(1)=O(1)+TT(J)
29.000 GO TO 30
30.000 10 O(5)=O(5)+TT(J)
31.000 GO TO 30
32.000 C
33.000 C ASSIGN MODE OF IMPORTANCE FOR UNKNOWN ACTIVITIES
34.000 15 IF(IMP(J).EQ.5 .OR. IMP(J).EQ.0)IMP(J)=MODE(HH(J))
35.000 DO 20 I=1,4
36.000 IF(IMP(J).NE.I)GO TO 20
37.000 O(I)=O(I)+TT(J)
38.000 20 CONTINUE
39.000 30 CONTINUE
40.000 C
41.000 DO 35 JJ=1,5
42.000 JOBN=JOBN+1
43.000 O(JOBN)=O(JJ)
44.000 35 CONTINUE
45.000 C-----
46.000 RETURN
47.000 END

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1.000 C *****
2.000 SUBROUTINE RISKER
3.000 C *****
4.000 C THIS PROGRAM CALCULATES THE PROBABILITY OF PARTICIPATION
5.000 C FOR EACH PLANNED ACTIVITY CONTAINED IN THE INDIVIDUAL'S
6.000 C ACTIVITY PROGRAM AND SUMS THESE PROBABILITIES BASED ON
7.000 C THE FOLLOWING ACTIVITY IMPORTANCE CATEGORIES:
8.000 C (1)VERY IMPORTANT
9.000 C (2)IMPORTANT
10.000 C (3)RELATIVELY UNIMPORTANT
11.000 C (4)UNIMPORTANT
12.000 C *****
13.000 C
14.000 COMMON/OBJECT/N,JOBN,0(15),HH(20),H(15)
15.000 COMMON/VALUE/IMP(15),MODE(16)
16.000 COMMON/TIME/TT(15),TA(15),TS(15),TD(15),TF(15),FT(10)
17.000 COMMON/ZONE/KLOC,LOC(15),NL(10),DIS(10,10)
18.000 C
19.000 DIMENSION PROB(15),D(10,10),F(15),S(15),SPROB(4)
20.000 C
21.000 C -----
22.000 C CALCULATE PARTICIPATION PROBABILITIES
23.000 C
24.000 J=1
25.000 SPROB(1)=0.000
26.000 SPROB(2)=0.000
27.000 SPROB(3)=0.000
28.000 SPROB(4)=0.000
29.000 NJ=2
30.000 IFLAG=0
31.000 F(1)=1.000
32.000 PROB(H(1))=1.00
33.000 26 IF(J.EQ.N)GO TO 38
34.000 J=J+1
35.000 L=NJ
36.000 X WRITE(6,198)J,NJ,L,HH(J),H(J)
37.000 198 FORMAT(2X,I2,2X,I2,2X,I2,2X,F4.0,2X,F4.0)
38.000 IF(HH(J).NE.16.0)GO TO 32
39.000 NJ=1
40.000 IFLAG=1
41.000 IF(H(J).EQ.0.0)GO TO 31
42.000 IF(H(J-1).EQ.0.0)GO TO 31
43.000 GO TO 33
44.000 31 PROB(H(J))=0.00
45.000 GO TO 26
46.000 32 IFLAG=0
47.000 33 DO 27 KK=1,KLOC
48.000 IF(LOC(J-1).NE.NL(KK))GO TO 27
49.000 KI=KK
50.000 27 CONTINUE
51.000 DO 28 K=1,KLOC
52.000 IF(LOC(J).NE.NL(K))GO TO 28
53.000 KJ=K
54.000 28 CONTINUE
55.000 D(KI,KJ)=DIS(KI,KJ)/60.0
56.000 S(L)=FT(H(J))-TF(J-1)-D(KI,KJ)-TD(J)
57.000 IF(S(L).GT.0.0)GO TO 44
58.000 X WRITE(6,339)
59.000 339 FORMAT(1X,'NEGATIVE SLACK TIME')
60.000 F(L)=0.00
61.000 GO TO 46
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64.000 180  FORMAT(2X,F7.2,2X,F7.2,2X,F10.5,2X,F7.2,2X,F10.5)
65.000      P(L)=(S(L)/D(KI,KJ))
66.000 X      WRITE(6,200)L,P(L)
67.000 200  FORMAT(2X,'L=',I2,2X,'P(L)=',F10.5)
68.000      IF(S(L).GE.D(KI,KJ))P(L)=1.00
69.000 46   CONTINUE
70.000 X      WRITE(6,200)L,P(L)
71.000      PP=1.0
72.000      NI=0
73.000 34   NI=NI+1
74.000 X      WRITE(6,205)NI,P(NI),PP
75.000 205  FORMAT(2X,'P(',I2,')=' ,F7.5,2X,'PP=' ,F7.5)
76.000      PP=P(NI)*PP
77.000      IF(NI.NE.L)GO TO 34
78.000      PROB(H(J))=PP
79.000      IF(IMP(J).EQ.5 .OR. IMP(J).EQ. 0)IMP(J)=MODE(HH(J))
80.000 X      WRITE(6,206)J,IMP(J)
81.000 206  FORMAT(2X,'J=',I2,'IMP(J)=',I2)
82.000 C
83.000      DO 35 KIN=1,4
84.000      IF(IMP(J).NE.KIN)GO TO 35
85.000      SPROB(KIN)=SPROB(KIN)+PROB(H(J))
86.000 X      WRITE(6,207)KIN,SPROB(KIN)
87.000 207  FORMAT(2X,'SPROB(',I2,')=' ,F8.5)
88.000 35   CONTINUE
89.000 C
90.000      IF(IFLAG.NE.1) NJ=NJ+1
92.000      GO TO 26
92.100 38   CONTINUE
93.000 C      DO 77 J=1,N
94.000 C      WRITE(6,166)J,H(J),H(J),PROB(H(J))
95.000 C166  FORMAT(2X,'H(',I2,')=' ,I2,5X,'PROB(',I2,')=' ,F7.5)
96.000 C 77  CONTINUE
97.000 C-----
98.000      DO 92 KIN=1,4
99.000      JOBN=JOBN+1
100.000     O(JOBN)=SPROB(KIN)
101.000 92   CONTINUE
102.000     RETURN
103.000     END

```

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1.000 C *****
2.000 SUBROUTINE HOMER
3.000 C *****
4.000 C THIS PROGRAM CALCULATES THE AMOUNT OF TIME SPENT
5.000 C AT HOME BY AN INDIVIDUAL. THE THREE CATEGORIES OF
6.000 C TIME CONSIDERED ARE:
7.000 C (1) TIME SPENT AT HOME WITH NO HOUSEHOLD
8.000 C MEMBERS PRESENT(T1)
9.000 C (2) TIME SPENT AT HOME WITH SOME HOUSEHOLD
10.000 C MEMBERS PRESENT(T2)
11.000 C (3) TIME SPENT AT HOME WITH ALL HOUSEHOLD
12.000 C MEMBERS PRESENT(T3)
13.000 C *****
14.000 C
15.000 COMMON/OBJECT/N,JOBN,D(15),HH(20),H(15)
16.000 COMMON/HOUSE/ITP,T(20),IHHSIZE(20),KP
17.000 COMMON/TIME/TT(15),TA(15),TS(15),TD(15),TF(15),FT(10)
18.000 C
19.000 DIMENSION TL(15),TR(15),E(40),TP(20,2),TM(20)
20.000 C -----
21.000 C
22.000 C CALCULATE HOME DEPARTURE(TL)AND ARRIVAL(TR)TIMES
23.000 C
24.000 X WRITE(6,500)ITP
25.000 500 FORMAT(2X,'ITP=',I3)
26.000 JM=0
27.000 JM=JM+1
28.000 TL(JM)=TA(JM)-TT(JM)
29.000 X WRITE(6,400)N
30.000 400 FORMAT(1X,'N=',I3)
31.000 DO 35 LL=2,N
32.000 IF(HH(LL).NE.16.0)GO TO 35
33.000 TR(JM)=TA(LL)
34.000 IF(LL.EQ.N)GO TO 40
35.000 JM=JM+1
36.000 TL(JM)=TA(LL+1)-TT(LL+1)
37.000 35 CONTINUE
38.000 C DO 33 IJ=1,JM
39.000 C WRITE(6,137)TL(IJ),TR(IJ)
40.000 C137 FORMAT(2X,F5.2,3X,F5.2)
41.000 C 33 CONTINUE
42.000 C
43.000 C CONSTRUCT UNORDERED LIST OF HOME EVENT TIMES
44.000 C
45.000 40 NMN=0
46.000 NN=0
47.000 MM=0
48.000 X WRITE(6,401)JM
49.000 401 FORMAT(1X,'JM=',I3)
50.000 48 NN=NN+1
51.000 MM=MM+1
52.000 E(NN)=TL(MM)
53.000 NN=NN+1
54.000 E(NN)=TR(MM)
55.000 IF(MM.NE.JM)GO TO 48
56.000 IF(TR(MM).GE.24.00)GO TO 58
57.000 MM=MM+1
58.000 TL(MM)=24.00
59.000 NN=NN+1
60.000 E(NN)=TL(MM)
61.000 58 NN=NN+1
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54.000      IF (NN.NE.NF) GO TO 28
65.000 C
66.000 C      WRITE ORIGINAL LIST OF EVENT TIMES
67.000 C
68.000 X      WRITE(6,131)NN
69.000      131  FORMAT(1X,'NN=',I3)
70.000 C      DO 59 IJ=1,NN
71.000 C      WRITE(6,130)E(IJ)
72.000 C130  FORMAT(2X,F5.2)
73.000 C 59   CONTINUE
74.000 C
75.000 C      SCAN LIST AND INTERCHANGE--REPEAT SCAN(NN-1)TIMES
76.000 C
77.000      DO 60 IJ=1,NN-1
78.000      IIJ=IJ+1
79.000      DO 60 IK=IIJ,NN
80.000 C      WRITE(6,132)E(IK),E(IJ)
81.000      132  FORMAT(1X,2X,F5.2,3X,F5.2)
82.000      IF(E(IK).GE.E(IJ))GO TO 60
83.000 C
84.000 C      E(IK) IS LESS THAN E(IJ)--INTERCHANGE
85.000 C
86.000      ESAVE=E(IJ)
87.000      E(IJ)=E(IK)
88.000      E(IK)=ESAVE
89.000      60   CONTINUE
90.000 C
91.000 C      WRITE REARRANGED LIST OF EVENT TIMES(CHRONOLOGICAL ORDER)
92.000 C
93.000 C      DO 62 IJ=1,NN
94.000 C      WRITE(6,130)E(IJ)
95.000 C 62   CONTINUE
96.000 C
97.000 C      CALCULATE THE AMOUNT OF TIME SPENT IN EACH OF THE THREE
98.000 C      AT HOME TIME CATEGORIES
99.000 C
100.000      T1=0.00
101.000      T2=0.00
102.000      T3=0.00
103.000      IF(ITP.EQ.0)GO TO 82
104.000      IFLAG=0
105.000      II=1
106.000      I=1
107.000      L=1
108.000      J=2
109.000      65  L=L+1
110.000 X      WRITE(6,122)L,IFLAG,E(L),TL(I),TR(I),T(J)
111.000      122  FORMAT(1X,'L=',I2,'IFLAG=',I2,'E(L)=',F5.2,'TL=',F5.2,
112.000      *'TR=',F5.2,'T=',F5.2)
113.000      IF(L.GT.NN)GO TO 75
114.000      IF(IFLAG.EQ.1)GO TO 68
115.000      IF(E(L).NE.TL(I))GO TO 70
116.000      IFLAG=1
117.000      TM(II)=TL(I)-E(L-1)
118.000      TP(II,1)=TL(I)
119.000      TP(II,2)=E(L-1)
120.000 X      WRITE(6,150)J-1,IHHSIZE(J-1),ITP
121.000      150  FORMAT(2X,'IHHSIZE(',I2,')=',I2,'ITP=',I2)
122.000      IF((IHHSIZE(J-1)).EQ.0)GO TO 22
123.000      IF((IHHSIZE(J-1)).EQ.ITP)GO TO 23
124.000      T2=T2+TM(II)
125.000      GO TO 26
126.000      22  T1=T1+TM(II)
127.000      GO TO 26
128.000      23  T3=T3+TM(II)

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```
130.000      GO TO 65
131.000      68  IF(E(L),EQ,TR(I))GO TO 69
132.000      J=J+1
133.000      GO TO 65
134.000      69  I=I+1
135.000      IFLAG=0
136.000      GO TO 65
137.000      70  TM(II)=T(J)-E(L-1)
138.000      TP(II,1)=T(J)
139.000      TP(II,2)=E(L-1)
140.000 X     WRITE(6,150)J-1,IHHSIZE(J-1),ITP
141.000      IF((IHHSIZE(J-1)),EQ,0)GO TO 27
142.000      IF((IHHSIZE(J-1)),EQ,ITP)GO TO 28
143.000      T2=T2+TM(II)
144.000      GO TO 29
145.000      27  T1=T1+TM(II)
146.000      GO TO 29
147.000      28  T3=T3+TM(II)
148.000      29  II=II+1
149.000      J=J+1
150.000      GO TO 65
151.000      75  DO 80 KL=1,II-1
152.000 X     WRITE(6,140)TP(KL,1),TP(KL,2),TM(KL)
153.000      140  FORMAT(3(5X,F5.2))
154.000      80  CONTINUE
155.000      GO TO 89
156.000      82  MM=NN-1
157.000      DO 88 KJ=1,MM,2
158.000      TM(KJ)=E(KJ+1)-E(KJ)
159.000      T1=T1+TM(KJ)
160.000      88  CONTINUE
161.000 C-----
162.000      89  JOBN=JOBN+1
163.000      O(JOBN)=T1
164.000      JOBN=JOBN+1
165.000      O(JOBN)=T2
166.000      JOBN=JOBN+1
167.000      O(JOBN)=T3
168.000      RETURN
169.000      END
```

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1.000 C *****
2.000 SUBROUTINE FAKER
3.000 C *****
4.000 C THIS PROGRAM CALCULATES AN INDIVIDUAL'S POTENTIAL TO
5.000 C TRAVEL TO DIFFERENT ACTIVITY LOCATIONS GIVEN THE
6.000 C CONSTRAINTS IMPOSED BY HIS/HER ACTIVITY PATTERN AND
7.000 C THE ADDITIONAL TRAVEL TIME THAT WOULD RESULT FROM
8.000 C THESE TRIPS.
9.000 C *****
10.000 C
11.000 COMMON/OBJECT/N,JOBN,0(15),HH(20),H(15)
12.000 COMMON/TIME/TT(15),TA(15),TS(15),TD(15),TF(15),FT(10)
13.000 COMMON/ZONE/KLOC,LDC(15),NL(10),DIS(10,10)
14.000 COMMON/FLEX/IGL00,START,END,MAP(66),LAP(276),KAP(276),
15.000 *DIST(2211),CDIS(55),DP(10,5),AP(5),DUR(5),BT(5),ET(5)
16.000 C
17.000 DIMENSION NLN(10),KLN(10),ILN(10),D(10,10),LY(10)
18.000 DATA NLN/28,43,44,47,53,54,57,59,64,66/
19.000 C-----
20.000 C
21.000 C CALCULATE UTILITY OF POTENTIAL TO PARTICIPATE IN
22.000 C UNPLANNED ACTIVITIES AND UTILITY OF TRAVEL TO
23.000 C UNPLANNED ACTIVITIES
24.000 C
25.000 UPA=0.0
26.000 UPT=0.0
27.000 C-----
28.000 C GRAND LOOP
29.000 C-----
30.000 DO 35 J=1,N
31.000 X WRITE(6,210)J,N
32.000 210 FORMAT(2X,'J=',I2,2X,'N=',I2)
33.000 IF(J.EQ.1)GO TO 12
34.000 IF(J.EQ.N)GO TO 13
35.000 IF(HH(J-1).NE.16.0)GO TO 35
36.000 IF(H(J-1).EQ.0.0)GO TO 99
37.000 IF(TA(J-1).LT.TS(J-1))GO TO 98
38.000 GO TO 35
39.000 98 W=TS(J-1)-TF(J-2)
40.000 IX=LDC(J-2)
41.000 JX=LDC(J-1)
42.000 X WRITE(6,212)J-1,TS(J-1),J-2,TF(J-2),W,IX,JX
43.000 212 FORMAT(1X,'TS(',I2,')=',F7.2,2X,'TF(',I2,')=',F7.2,2X,'W=',
44.000 *F7.2,2X,'IX=',I3,1X,'JX=',I3)
45.000 GO TO 44
46.000 99 W=TS(J)-TF(J-2)
47.000 IX=LDC(J-2)
48.000 JX=LDC(J)
49.000 X WRITE(108,158)J,TS(J),J-2,TF(J-2),W,IX,JX
50.000 158 FORMAT(1X,'TS(',I2,')=',F7.2,2X,'TF(',I2,')=',F7.2,2X,'W=',
51.000 *F7.2,2X,'IX=',I3,1X,'JX=',I3)
52.000 GO TO 44
53.000 12 TLH=TA(J)-TT(J)
54.000 X WRITE(108,159)J,TLH,START
55.000 159 FORMAT(2X,'J=',I2,2X,'TLH=',F7.2,2X,'START=',F7.2)
56.000 IF(TLH.LE.START)GO TO 35
57.000 W=TS(J)-START
58.000 X WRITE(108,144)W
59.000 144 FORMAT(2X,'THE TIME WINDOW=',F7.2)
60.000 IX=IGL00
61.000 JX=LDC(J)
62.000 X WRITE(108,160)IX,JX
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64.000 GO TO 44
65.000 13 TAH=TF(N-1)+TT(N)
66.000 X WRITE(108,157)J,TAH,END
67.000 157 FORMAT(2X,'J=',I2,2X,'TAH=',F7.2,2X,'END=',F7.2)
68.000 IF(TAH.GE.END)GO TO 35
69.000 W=END-TF(N-1)
70.000 X WRITE(108,144)W
71.000 IX=LOC(N-1)
72.000 JX=IGLOO
73.000 X WRITE(108,160)IX,JX
74.000 44 IF((IX.LE.276).AND.(JX.LE.276))GO TO 128
75.000 IF(IX.GT.276)GO TO 48
76.000 JJ=JX-276
77.000 DO 49 L=1,276
78.000 IF(IX.NE.L)GO TO 49
79.000 IN=LAP(L)
80.000 II=IN-276
81.000 X WRITE(108,201)II,JJ
82.000 201 FORMAT(2X,'II=',I4,2X,'JJ=',I4)
83.000 49 CONTINUE
84.000 GO TO 78
85.000 48 IF(JX.GT.276)GO TO 58
86.000 II=IX-276
87.000 DO 51 L=1,276
88.000 IF(JX.NE.L)GO TO 51
89.000 JN=LAP(L)
90.000 JJ=JN-276
91.000 X WRITE(108,201)II,JJ
92.000 51 CONTINUE
93.000 GO TO 78
94.000 58 II=IX-276
95.000 JJ=JX-276
96.000 X WRITE(108,201)II,JJ
97.000 C
98.000 C----- <DO 40> -----
99.000 C
100.000 78 DO 40 K=1,10
101.000 LI=II
102.000 NI=II
103.000 LJ=JJ
104.000 NJ=JJ
105.000 DO 36 KKK=1,10
106.000 KLN(KKK)=NLN(KKK)
107.000 ILN(KKK)=NLN(KKK)
108.000 36 CONTINUE
109.000 X WRITE(108,202)NI,K,NLN(K)
110.000 202 FORMAT(2X,'NI=',I4,2X,'NLN(',I2,')=(',I4)
111.000 IF(NI.GE.NLN(K))GO TO 118
112.000 IY=NI
113.000 NI=KLN(K)
114.000 KLN(K)=IY
115.000 X WRITE(108,203)NI,K,KLN(K)
116.000 203 FORMAT(2X,'NI=',I4,2X,'KLN(',I2,')=',I4)
117.000 118 KK=(NI-1)*NI/2+KLN(K)
118.000 DIK=DIST(KK)/60.0
119.000 X WRITE(108,161)KK,NI,KLN(K),DIK
120.000 161 FORMAT('KK=',I5,2X,'TRAVEL TIME BETWEEN',I5,1X,'AND',I5,1X,
121.000 *'= ',F7.2)
122.000 IF(J.EQ.1)GO TO 28
123.000 IF(J.EQ.N)GO TO 29
124.000 TARV=TF(J-2)+DIK
125.000 X WRITE(108,162)KLN(K),TARV
126.000 GO TO 38
127.000 28 TARV=START+DIK

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130.000 29 TARV=TF(J-1)+DIK
131.000 X WRITE(108,162)KLN(K),TARV
132.000 162 FORMAT(2X,'TIME OF ARRIVAL AT LOCATION',I5,1X,'=',F7.2)
133.000 38 IF(NLN(K).GE.JJ)GO TO 119
134.000 LY(K)=ILN(K)
135.000 ILN(K)=NJ
136.000 NJ=LY(K)
137.000 X WRITE(108,500)K,ILN(K),NJ
138.000 500 FORMAT(2X,'ILN(',I2,')=',I4,2X,'NJ=',I4)
139.000 119 KK=(ILN(K)-1)*ILN(K)/2+NJ
140.000 X WRITE(108,666)K,ILN(K),NJ,KK
141.000 666 FORMAT(2X,'ILN(',I2,')=',I4,2X,'NJ=',I4,2X,'KK=',I4)
142.000 DKJ=DIST(KK)/60.0
143.000 X WRITE(108,161)KK,NJ,ILN(K),DKJ
144.000 DK=DIK+DKJ
145.000 IF(II.GE.JJ)GO TO 60
146.000 LYL=LI
147.000 LI=LJ
148.000 LJ=LYL
149.000 X WRITE(108,505)LI,LJ
150.000 505 FORMAT(2X,'LI=',I4,2X,'LJ=',I4)
151.000 60 KK=(LI-1)*LI/2+LJ
152.000 DIJ=DIST(KK)/60.0
153.000 X WRITE(108,161)KK,LI,LJ,DIJ
154.000 XT=(DIK+DKJ)-DIJ
155.000 X WRITE(6,699)XT
156.000 699 FDRMAT(2X,'XT=',F8.5)
157.000 DO 40 L=1,5
158.000 IF(TARV.LT.BT(L))TARV=BT(L)
159.000 X WRITE(108,162)KLN(K),TARV
160.000 X WRITE(108,707)TARV,L,DUR(L),L,ET(L)
161.000 707 FORMAT(2X,'TARV=',F6.2,1X,'DUR(',I2,')=',F5.2,1X,'ET(',
162.000 *I2,')=',F6.2)
163.000 IF((TARV+DUR(L)).GT.ET(L))GO TO 40
164.000 IF(H(J-1).NE.0.0)TS(J)=TS(J-1)
165.000 IF(J.EQ.N)TS(J)=END
166.000 X WRITE(108,708)TARV,L,DUR(L),DKJ,J,TS(J)
167.000 708 FORMAT(2X,'TARV=',F6.2,1X,'DUR(',I2,')=',F5.2,1X,'DKJ=',
168.000 *F7.4,1X,'TS(',I2,')=',F6.2)
169.000 IF((TARV+DUR(L)+DKJ).GT.TS(J))GO TO 40
170.000 X WRITE(6,700)K,L,DP(K,L),L,AP(L),XT
171.000 700 FORMAT(2X,'DP(',I2,1X,I2,')=',F6.4,1X,'AP(',I2,')=',F6.4,
172.000 *1X,'XT=',F8.5)
173.000 UPA=UPA+(DP(K,L)*AP(L))
174.000 UPT=UPT+(DP(K,L)*AP(L)*XT)
175.000 X WRITE(108,166)UPA,UPT
176.000 40 CONTINUE
177.000 C
178.000 C----- END <DO 40> -----
179.000 C
180.000 GO TO 35
181.000 C
182.000 128 DO 67 L=1,276
183.000 IF(IX.NE.L)GO TO 67
184.000 II=KAP(L)
185.000 67 CONTINUE
186.000 DO 69 L=1,276
187.000 IF(JX.NE.L)GO TO 69
188.000 JJ=KAP(L)
189.000 C WRITE(108,201)II,JJ
190.000 69 CONTINUE
191.000 C
192.000 C----- <DO 90> -----
193.000 C
194.000 DO 90 K=1,10

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197,000      LJ=JJ
198,000      NJ=JJ
199,000      LK=K
200,000      NK=K
201,000      X WRITE(108,163)K,LK,NK,NI,NJ,LJ
202,000      163  FORMAT(2X,'K=',I4,2X,'LK=',I4,2X,'NK=',I4,2X,'NI=',I4,2X,
203,000      *,'NJ=',I4,2X,'LJ=',I4)
204,000      IF(NI,GE,K)GO TO 18
205,000      IY=NI
206,000      NI=NK
207,000      NK=IY
208,000      18  KK=(NI-1)*NI/2+NK
209,000      D(II,K)=CDIS(KK)/60.0
210,000      X  WRITE(108,164)II,K,D(II,K)
211,000      164  FORMAT(2X,'THE TRAVEL TIME BETWEEN',I5,IX,'AND',I5,IX,'=',F7,2)
212,000      IF(J,EQ,1)GO TO 70
213,000      IF(J,EQ,N)GO TO 71
214,000      TARU=TF(J-2)+D(II,K)
215,000      X  WRITE(108,711)K,TARU
216,000      711  FORMAT(2X,'K=',I2,IX,'TARU=',F6,2)
217,000      GO TO 75
218,000      70  TARU=START+D(II,K)
219,000      X  WRITE(108,711)K,TARU
220,000      GO TO 75
221,000      71  TARU=TF(J-1)+D(II,K)
222,000      X  WRITE(108,711)K,TARU
223,000      75  IF(K,GE,JJ)GO TO 19
224,000      X  WRITE(108,206)K,JJ
225,000      206  FORMAT(2X,'K=',I4,2X,'JJ=',I4)
226,000      KY=LK
227,000      LK=NJ
228,000      NJ=KY
229,000      X  WRITE(108,180)LK,NJ
230,000      180  FORMAT(2X,'LK=',I3,2X,'NJ=',I3)
231,000      19  KK=(LK-1)*LK/2+NJ
232,000      D(K,JJ)=CDIS(KK)/60.0
233,000      X  WRITE(108,164)K,JJ,D(K,JJ)
234,000      DK=D(II,K)+D(K,JJ)
235,000      X  WRITE(108,168)II,K,JJ,DK
236,000      168  FORMAT(2X,'THE TOTAL TRAVEL TIME FROM',I5,IX,'TO',I5,IX,'TO',
237,000      *,'I5,IX,'=',F7,2)
238,000      IF(LI,GE,LJ)GO TO 24
239,000      LYL=LI
240,000      LI=LJ
241,000      LJ=LYL
242,000      24  KK=(LI-1)*LI/2+LJ
243,000      D(II,JJ)=CDIS(KK)/60.0
244,000      X  WRITE(108,164)II,JJ,D(II,JJ)
245,000      XT=(DK-D(II,JJ))
246,000      X  WRITE(6,699)XT
247,000      DO 90 L=1,5
248,000      IF(TARU,LT,BT(L))TARU=BT(L)
249,000      X  WRITE(108,707)TARU,L,DUR(L),L,ET(L)
250,000      IF((TARU+DUR(L)),GT,ET(L))GO TO 90
251,000      IF(H(J-1),NE,0.0)TS(J)=TS(J-1)
252,000      IF(J,EQ,N)TS(J)=END
253,000      X  WRITE(108,718)TARU,L,DUR(L),K,JJ,D(K,JJ),J,TS(J)
254,000      718  FORMAT(2X,'TARU=',F6,2,IX,'DUR(',I2,')=',F6,2,IX,
255,000      *,'D(',I2,IX,I2,')=',F6,2,IX,'TS(',I2,')=',F6,2)
256,000      IF((TARU+DUR(L))+DKJ),GT,TS(J))GO TO 90
257,000      X  WRITE(6,700)K,L,DP(K,L),L,AP(L),XT
258,000      UPA=UPA+(DP(K,L)*AP(L))
259,000      UPT=UPT+(DP(K,L)*AP(L)*XT)
260,000      X  WRITE(108,166)UPA,UPT

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261.000 166 FORMAT(//,2X,'UFA =',F10.4,' AND UPT =',F10.4)
262.000 90 CONTINUE
263.000 C
264.000 C----- END <DO 90> -----
265.000 C
266.000 35 CONTINUE
267.000 C-----
268.000 C END OF GRAND LOOP
269.000 C-----
270.000 JOBN=JOBN+1
271.000 O(JOBN)=UFA
272.000 JOBN=JOBN+1
273.000 O(JOBN)=UPT
274.000 C-----
275.000 RETURN
276.000 END

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*E XWAITER
*TY

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1.000 C *****
2.000 SUBROUTINE WAITER
3.000 C *****
4.000 C THIS PROGRAM CALCULATES THE AMOUNT OF TIME AN
5.000 C INDIVIDUAL SPENDS WAITING TO PERFORM ACTIVITIES
6.000 C *****
7.000 C
8.000 COMMON/OBJECT/N,JOBN,O(15),HH(20),H(15)
9.000 COMMON/IDLE/TI(15)
10.000 C-----
11.000 JOBN=JOBN+1
12.000 WT=0.00
13.000 DO 30 J=2,N
14.000 IF(HH(J).EQ.16.0)GO TO 30
15.000 WT=WT+TI(J)
16.000 30 CONTINUE
17.000 O(JOBN)=WT
18.000 C-----
19.000 RETURN
20.000 END

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1.000      SUBROUTINE CHOPPER
2.000      COMMON/ITER/ITRACK, IOBS, NTRACK, JOBN, O(40, 200)
3.000      COMMON/CRIT/ISET, NNOBJ, KKEY(40), NFILE, ITOT, NINF
4.000      COMMON/RETAIN/KTRACK(200), OB(40, 200), INOS, IHOLD
5.000      COMMON/OBJPAR/NOBJ, MOBJ(40), KEY(40), KEY2(40), NF1, NF2,
6.000      . K1, K2, K3, K4, K5, FMT1(20), FMT2(20), FMT3(20), FMT4(20)
6.100      COMMON/CHOP/HITS, NUMB, PRED, NOBS
7.000      DIMENSION NULL(40)
8.000 C-----
9.000 C      SYSTEMATIC GENERATION OF CRITERIA SETS
10.000 C-----
11.000 C      VARIABLES:
12.000 C-----
13.000 C      K5          = MAXIMUM NUMBER OF OBJECTIVES
14.000 C      NOBJ       = NUMBER OF OBJECTIVES IN TEST SET
16.000 C      NULL(I)    = ELIMINATED CRITERIA IDENTIFICATION INDEX
17.000 C      KEY2(I)    = SEQUENTIAL COUNTER FOR OBJECTIVES
17.100 C      PRED      = PERCENT OF OBSERVED PATTERNS IN THE SET
17.200 C                  OF NON-INFERIOR PATTERNS
17.300 C      NUMB      = TOTAL NUMBER OF NON-INFERIOR PATTERNS
17.400 C                  FOR ALL INDIVIDUALS
17.500 C      HITS      = NUMBER OF INDIVIDUALS CORRECT
17.600 C      NOBS      = TOTAL NUMBER OF INDIVIDUALS
18.000 C-----
19.000      WRITE(108, 200)
20.000      200 FORMAT(/ /3X, 72(1H-)/3X,
21.000      . 37H NOBJ          PRED      NUMB          OBJECTIVES
22.000      . /3X, 72(1H-))
23.000 C
24.000      PRED0=0.0
25.000      PRED1=0.0
26.000      DO 1 L=1, K5
27.000      KEY2(L)=0
28.000      1 NULL(L)=0
29.000 C
30.000 C      INCREMENT SIZE OF THE CRITERIA SET:
31.000 C-----
32.000      NOBJ=0
33.000      10 NOBJ=NOBJ+1
33.100      NUMB=0
33.200      HITS=0.0
34.000      DO 20 I=1, K5
35.000      IF(NULL(I).EQ.1) GO TO 20
36.000      DO 15 K=1, K5
37.000      IF(KEY2(K).EQ.1) GO TO 20
38.000      15 CONTINUE
39.000      KEY2(NOBJ)=I
40.000 C
41.000 C      SELECT NON-INFERIOR PATTERNS
42.000 C-----
43.000      CALL SPLITTER
44.000 C
44.100      OBS=NOBS
44.200      PRED=HITS/OBS
45.000      IF(PRED.GT.PRED1) GO TO 18
46.000      NULL(I)=1
47.000      GO TO 20
48.000      18 PRED1=PRED
49.000      IL1=I
50.000      20 WRITE(108, 108) I, IL1, NULL(I), PRED, HITS, NOBS, NUMB
50.100      108 FORMAT(3I5, 2F7.4, 2I5)
51.000 C

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52.000 C -----
53.000 C
54.000 IF(PRED0.GE.PRED1) GO TO 1005
55.000 C
56.000 C SAVE BEST ADDED CRITERIA
57.000 C -----
58.000 PRED0=PRED1
59.000 KEY2(L1)=IL1
60.000 C
61.000 C OUTPUT OBJECTIVE SET
62.000 C -----
63.000 WRITE(108,210)NOBJ,PRED,NUMB,(KEY2(J),J=1,NOBJ)
64.000 210 FORMAT(3X,I5,F10.4,2X,I5,15I3/(25X,15I3))
65.000 IF(NOBJ.LT.K5)GO TO 10
66.000 C-----
67.000 1005 WRITE(108,1010)
68.000 1010 FORMAT(3X,72(1H-)/3X,
69.000 , 40H NO IMPROVEMENT IN LARGER OBJECTIVE SETS
70.000 , /3X,72(1H-)//)
71.000 C-----
72.000 RETURN
73.000 END

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1.000      SUBROUTINE SPLITTER
1.500      COMMON/CHOP/HITS,NUMB,PRED,NOBS
2.000      COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,D(40,200)
3.000      COMMON/CRIT/ISET,NNOBJ,KKEY(40),NFILE,ITOT,NINF
4.000      COMMON/RETAIN/KTRACK(200),OB(40,200),INOS,IHOLD
5.000      COMMON/OBJPAR/NOBJ,MOBJ(40),KEY(40),KEY2(40),NF1,NF2,
6.000      . K1,K2,K3,K4,K5,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000      DIMENSION TITLE(18),ALPH(3,10)
8.000 C
9.000 C *** ADD ALPH ARRAY ***
10.000 C
11.000 C-----
12.000 C      PROGRAM TESTS FOR PATTERN NON-INFERIORITY USING VARIOUS
13.000 C      SUBSETS OF CALCULATED MULTI-OBJECTIVE CRITERIA
14.000 C-----
15.000 C      VARIABLES:
16.000 C      -----
17.000 C      K5      = MAXIMUM NUMBER OF OBJECTIVES FOR ANALYSIS
18.000 C      NNOBJ   = TOTAL NUMBER OF CALCULATED OBJECTIVE
19.000 C              VALUES (NOBJ IN SNOOPER)      [ MAX =40 ]
20.000 C      NOBJ    = NUMBER OF OBJECTIVES SELECTED FOR ANALYSIS
21.000 C      KEY(I)   = IDENTIFIES SELECTED OBJECTIVES
22.000 C              (KEY(I)=1 if selected, 0 if not; for I=1,40)
23.000 C      MOBJ(I) = IDENTIFIES OBJECTIVE OPTIMIZATION
24.000 C              (1=maximize, 0=minimize)
25.000 C      KEY2(I) = SEQUENTIAL COUNTER FOR NOBJ IN SMOOPER
26.000 C      KKEY(I) = SET FOR ANY INDIVIDUAL (KEY2(I) IN SNOOPER)
27.000 C-----
28.000      NOBS=0
29.000 C
30.000 C      INPUT FOR FIRST INDIVIDUAL:
31.000 C      -----
32.000      25 READ(NF1,FMT1,END=68)IOBS,KHHN,KPN,NFILE,IGLOO,START,END,ITOT
33.000      NOBS=NOBS+1
34.000      READ(NF1,120)NNOBJ,(KKEY(I),I=1,NNOBJ)
35.000      120 FORMAT(I5,6(I7,5X)/(5X,6(I7,5X)))
36.000 C
37.000 C      TEST FOR VALID CHOICE OF CRITERIA
38.000 C      -----
39.000 C      (IS CRITERION IN ORIGINAL SET? (KKEY(I), NOT KEY2(I))
40.000 C      DO 40 I=1,NOBJ
41.000 C      DO 30 J=I,NNOBJ
42.000 C      IF(KEY2(I).EQ.KKEY(J))GO TO 40
43.000 C      30 CONTINUE
44.000 C      WRITE(108,210)IOBS,ISET
45.000 C      210 FORMAT(//' ***INPUT ERROR***'// ' INPUT CRITERIA NOT',
46.000 C      * ' IN ORIGINAL SET'// ' OBSERVATION',I4,' CHOICE SET',I4/)
47.000 C      GO TO 1000
48.000 C      40 CONTINUE
49.000 C      IF(K4.NE.1) GO TO 45
50.000 C
51.000 C      PRODUCE CRITERIA SET HEADER
52.000 C      -----
53.000 C      WRITE(108,238)ISET
54.000 C      238 FORMAT(//1X,11(4H----)// ' SPECIFICATION OF NON-INFERIOR'
55.000 C      * ', ' PATTERNS'/1X,11(4H----)/4X,' CRITERIA SET NO.',I3)
56.000 C      DO 42 I=1,NOBJ
57.000 C      II=KEY2(I)
58.000 C      42 WRITE(108,240)I,(ALPH(J,II),J=1,3)
59.000 C      240 FORMAT(6X,I2,'. ',3A4)
60.000 C      WRITE(108,242)
61.000 C      242 FORMAT(1X,11(4H----))

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64.000 C -----
65.000 45 NTRACK=1
66.000 KTRACK(1)=1
67.000 CALL SHIFTER
68.000 DO 50 J=1,NOBJ
69.000 50 OB(J,1)=O(J,1)
70.000 C -----
71.000 C READ ADDITIONAL FEASIBLE PATTERN OBJECTIVES AND
72.000 C TEST FOR NON-INFERIORITY IN SR SWEEPER
73.000 C -----
74.000 DO 60 ITRACK=2,ITOT
75.000 CALL SHIFTER
76.000 NTRACK=NTRACK+1
77.000 KTRACK(NTRACK)=ITRACK
78.000 CALL SWEEPER
79.000 60 CONTINUE
80.000 C
81.000 C OUTPUT NON-INFERIOR PATTERNS
82.000 C -----
83.000 IF(K3.EQ.0)CALL CHUCKER
84.000 IF(K3.NE.0) CALL HITTER(KHHN,KPN)
85.000 C
86.000 C INPUT A NEW INDIVIDUAL
87.000 C -----
88.000 GO TO 25
89.000 C -----
90.000 C COMPLETED FOR ALL INDIVIDUALS
91.000 C -----
92.000 68 IF(K3.EQ.0) WRITE(108,310)ISET,NOBS
93.000 310 FORMAT(//' END OF ANALYSIS FOR CRITERIA SET',I4/
94.000 * I4,' INDIVIDUALS TESTED'/)
95.000 1000 REWIND NF1
96.000 REWIND NF2
96.100 REWIND 54
97.000 C -----
98.000 RETURN
99.000 END

```

*

*E XSHIFTER

*TY

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1.000 SUBROUTINE SHIFTER
2.000 COMMON/CRIT/ISET,NNOBJ,KKEY(40),NFILE,ITOT,NINF
3.000 COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,O(40,500)
4.000 COMMON/RETAIN/KTRACK(500),OB(40,500),INOS,IHOLD
5.000 COMMON/OBJPAR/NOBJ,MOBJ(40),KEY(40),KEY2(40),NF1,NF2,
6.000 K1,K2,K3,K4,K5,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
7.000 C -----
8.000 C CONVERT THE OBJECTIVE ARRAY TO REFLECT ONLY THOSE
9.000 C OBJECTIVES SPECIFIED FOR ANALYSIS
10.000 C -----
11.000 READ(NF1,100)K,(OB(J,K),J=1,NNOBJ)
12.000 100 FORMAT(15,6E12.4/(5X,6E12.4))
13.000 DO 20 J=1,NOBJ
14.000 JJ=KEY2(J)
15.000 20 O(J,K)=OB(JJ,K)
16.000 RETURN
17.000 END

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1.000      SUBROUTINE SWEEPER
2.000      DIMENSION DIFF(40),OBJ(40),KIK(40)
3.000      COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,O(40,200)
4.000      COMMON/OBJPAR/NOBJ,MOBJ(40),KEY(40),KEY2(40),NF1,NF2,K1,
5.000      K2,K3,K4,K5,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
6.000      COMMON/RETAIN/KTRACK(200),OB(40,200),INOS,IHOLD
7.000
8.000 C-----
9.000 C      COMPARE EACH OBJECTIVE FOR EACH PATTERN.
10.000 C      ANY PATTERN THAT RANKS HIGHER ON AT LEAST ONE
11.000 C      OBJECTIVE IS CONSIDERED NON-INFERIOR. ANY PATTERN
12.000 C      SCORING LOWER THAN ANY NON-INFERIOR PATTERN ON EVERY
13.000 C      OBJECTIVE IS ELIMINATED FROM THE SOLUTION SET.
14.000 C-----
15.000      J=1
16.000      DO 60 I=1,NOBJ
17.000      OBJ(I)=O(I,ITRACK)
18.000      OB(I,NTRACK)=O(I,ITRACK)
19.000 60    CONTINUE
20.000      IF(ITRACK.NE.2)GO TO 6
21.000      INOS=ITRACK-1
22.000      INDT=INOS-1
23.000      LM=0
24.000      GO TO 8
25.000 6    IF(LM.NE.1)GO TO 8
26.000      DO 65 I=1,NOBJ
27.000      OB(I,IHOLD)=O(I,ITRACK)
28.000 65    CONTINUE
29.000      KTRACK(IHOLD)=ITRACK
30.000      NTRACK=IHOLD
31.000      LM=0
32.000 8    IF(J.GT.INOS)GO TO 22
33.000      DO 70 I=1,NOBJ
34.000      DIFF(I)=OBJ(I)-OB(I,J)
35.000 70    CONTINUE
36.000      I=1
37.000 4    EPS=0.001*OB(I,J)
38.000      IF((ABS(DIFF(I))).LT.EPS)DIFF(I)=0.0
39.000      II=KEY2(I)
40.000      IF(DIFF(I).GT.0.0.AND.MOBJ(II).EQ.1)GO TO 9
41.000      IF(DIFF(I).LT.0.0.AND.MOBJ(II).EQ.0)GO TO 9
42.000      IF(DIFF(I).EQ.0.0)GO TO 10
43.000      KIK(I)=0
44.000      IF(I.EQ.1)GO TO 13
45.000      IF(KIK(I-1).NE.2)GO TO 12
46.000      GO TO 13
47.000 9    KIK(I)=1
48.000      IF(I.EQ.1)GO TO 13
49.000      IF(KIK(I-1).NE.2)GO TO 12
50.000      GO TO 13
51.000 10   KIK(I)=2
52.000      IF(I.EQ.1)GO TO 13
53.000      IF(KIK(I-1).EQ.2)GO TO 13
54.000      IF(KIK(I-1).EQ.1)GO TO 11
55.000      KIK(I)=0
56.000      GO TO 13
57.000 11   KIK(I)=1
58.000      GO TO 13
59.000 12   IF(KIK(I).NE.KIK(I-1))GO TO 17
60.000 13   IF(I.EQ.NOBJ)GO TO 14
61.000      I=I+1
62.000      GO TO 4

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65.000      LM=1
66.000      IHOLD=INOS+1
67.000      GO TO 20
68.000  15   IF(J,NE,1)GO TO 18
69.000      NTRACK=NTRACK-1
70.000      DO 16 L=1,INOS
71.000      DO 16 I=1,NOBJ
72.000      OB(I,L)=OB(I,L+1)
73.000  16   CONTINUE
74.000      DO 40 L=1,INOS
75.000      KTRACK(L)=KTRACK(L+1)
76.000  40   CONTINUE
77.000      INOS=INOS-1
78.000      GO TO 8
79.000  18   NTRACK=NTRACK-1
80.000      DO 19 M=J,INOS
81.000      DO 19 I=1,NOBJ
82.000      OB(I,M)=OB(I,M+1)
83.000  19   CONTINUE
84.000      DO 41 M=J,INOS
85.000      KTRACK(M)=KTRACK(M+1)
86.000  41   CONTINUE
87.000      IF(J,EQ,INOS)GO TO 78
88.000      INOS=INOS-1
89.000      GO TO 8
90.000  78   LM=1
91.000      IHOLD=INOS+1
92.000      GO TO 20
93.000  17   J=J+1
94.000      GO TO 8
95.000  22   INOS=INOS+1
96.000  20   RETURN
97.000      END
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1.000      SUBROUTINE CHUCKER
2.000      COMMON/BANK/N,AH(12),AHH(12),IMP(12),IFREQ(12),KNOW(12),
3.000      . LOC(12),M(12),TT(12),TA(12),TI(12),TS(12),TD(12),TF(12)
4.000      COMMON/ITER/ITRACK,IOBS,NTRACK,JOBN,0(40,200)
5.000      COMMON/RETAIN/KTRACK(200),OB(40,200),INOS,IHOLD
6.000      COMMON/OBJPAR/NOBJ,MOBJ(40),KEY(40),KEY2(40),NF1,NF2,
7.000      . K1,K3,K4,K5,FMT1(20),FMT2(20),FMT3(20),FMT4(20)
8.000      COMMON/CRIT/ISSET,NNOBJ,KKEY(40),NFILE,ITOT,NINF
9.000      DIMENSION ALPH(40,3)
10.000     DATA ((ALPH(I,J),J=1,3),I=1,6)/'TRAV','EL T','IME ',
11.000     *'COMP','LEXI','TY ','WAIT','TIM','E ','SLAC',
12.000     *'K TI','ME ','FLEX','IBIL','ITY ','TIME',' AT ',
13.000     *'HOME'/
14.000
15.000 C-----
16.000 C      SR REMOVE IDENTIFIED NON-INFERIOR PATTERNS BASED
17.000 C      ON VARIOUS MULTIPLE CRITERIA SETS. THE ASSOCIATED
18.000 C      PATTERN SPECIFICATIONS ARE OUTPUT BELOW.
19.000 C-----
20.000 C      READ PERSON LABEL FROM PATTERN DATA
21.000     READ(NF2,FMT1)IOBS,KHHN,KPN,NACT,IGLOO,START,END
22.000     DO 5 NF=22,23
23.000       5 WRITE(NF,FMT1)IOBS,KHHN,KPN,NACT,IGLOO,START,END,INOS
24.000 C
25.000     WRITE(23,205)NOBJ,(KEY2(I),I=1,NOBJ)
26.000     205 FORMAT(15,6(17,5X)/(5X,6(17,5X)))
27.000 C
28.000 C      PRINTED HEADER
29.000     WRITE(108,100)IOBS,INOS,NFILE
30.000     100 FORMAT(/5X,11(4H----)/3X,' INDIVIDUAL',I3,' HAS',I4,
31.000     *' NON-INFERIOR PATTERNS'/3X,' (PROGRAM HAS',I2,
32.000     *' PLANNED ACTIVITIES)'/5X,11(4H----))
33.000 C
34.000 C      SELECT NON-INFERIOR SOLUTIONS
35.000     DO 50 I=1,INOS
36.000     NINF=KTRACK(I)
37.000     CALL PLUCKER
38.000     WRITE(22,210)IOBS,I,N,NINF
39.000     210 FORMAT(4I5)
40.000     IF(K1.NE.0.OR.K2.NE.0)WRITE(108,105)IOBS,I,NINF
41.000     105 FORMAT(/' INDIVIDUAL',I3,' NON-INFERIOR PATTERN',
42.000     * I4,' FEASIBLE PATTERN',I4/18(4H----))
43.000     IF(K1.NE.0)WRITE(108,110)
44.000     110 FORMAT(' I I ',5X,'ACTIVITY',6X,' I TRAVEL I ',6X,'TEMPORAL',
45.000     . ' SPECIFICATIONS I ',5X,' I/' I I ',19(1H-),1H,10(1H-),
46.000     . 1H,35(1H-),1H,5X,1H/' I I ',1H,'NO TP IM FR KN ZONEIMODE',
47.000     . ' TIME|ARRIVAL IDLE START LENGTH FINISH I '/' I',
48.000     . 25(3H---),2H-I)
49.000     DO 30 J=1,NN
50.000     IF(K1.NE.0)WRITE(108,115)J,AH(J),AHH(J),IMP(J),IFREQ(J),
51.000     . KNOW(J),LOC(J),M(J),TT(J),TA(J),TI(J),TS(J),TD(J),TF(J)
52.000     WRITE(15,116)J,AH(J),AHH(J),IMP(J),IFREQ(J),KNOW(J),LOC(J),
53.000     . M(J),TT(J),TA(J),TI(J),TS(J),TD(J),TF(J)
54.000     30 CONTINUE
55.000     115 FORMAT(' I',I2,' I',I2,4I3,I4,' I',I3,F6.2,' I',5F7.2,
56.000     . ' I',5X,' I')
57.000     116 FORMAT(2(2X,I2),4I3,2(I4,1X),F5.2,2X,5F7.2)
58.000     IF(K1.NE.0)WRITE(108,118)
59.000     118 FORMAT(1X,19(4H----),2H--)
60.000 C
61.000 C      OUTPUT ASSOCIATED CRITERIA
62.000     IF(K2.EQ.0)GO TO 40

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66.000      DO 35 J=1,NOBJ
67.000      II=KEY2(J)
68.000      35 WRITE(108,125)J,(ALPH(II,K),K=1,3),O(J,NINF)
69.000      125 FORMAT(16X,I2,1X,3A4,F9.2)
70.000      WRITE(108,130)
71.000      130 FORMAT(16X,12(2H--))
72.000      40 WRITE(18,220)NINF,(O(J,NINF),J=1,NOBJ)
73.000      220 FORMAT(15,8F9.2)
74.000      50 CONTINUE
75.000 C
76.000 C      INSERT ON F:22 KEY TO IDENTIFY END OF INDIVIDUAL
77.000 C      -----
78.000      WRITE(22,250)
79.000      250 FORMAT(' 9999')
80.000      RETURN
81.000      END

```

*

*E XHITTER

*TY

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1.000      SUBROUTINE HITTER(KH,KP)
2.000      COMMON/RETAIN/KTRACK(200),OB(40,200),INOS,IHOLD
3.000      COMMON/CHOP/HITS,NUMB,PRED,NOBS
4.000 C-----
5.000 C      INCREMENT THE NUMBER OF HITS (AN OCCURANCE OF THE
6.000 C      OBSERVED PATTERN IN THE NON-INFERIOR SUBSET) AND
7.000 C      THE TOTAL NUMBER OF NON-INFERIOR PATTERNS.
8.000 C      (INPUT OBSERVED PATTERN FROM F:54)
9.000 C-----
10.000     READ(54,100)KHHN,KPN,INT
11.000     100 FORMAT(5X,2I5,20X,I5)
12.000     IF(KHHN.NE,KH .OR. KPN.NE,KP)GO TO 1005
13.000 C
14.000     NUMB=NUMB+INOS
15.000     DO 20 I=1,INOS
16.000     IF(KTRACK(I).EQ,INT)GO TO 30
17.000     20 CONTINUE
18.000     RETURN
19.000     30 HITS=HITS+1.0
20.000     RETURN
21.000 C-----
22.000     1005 WRITE(108,1006)KH,KP
23.000     1006 FORMAT(/3X,40H*** ERROR -- INCORRECT INPUT ON UNIT 54
24.000     . /6X,11H (HOUSEHOLD,I5,5X,7H PERSON,I5,1H)/)
25.000     STOP 5
26.000     END

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1.000      SUBROUTINE PLUCKER
2.000      COMMON/BANK/N,AH(12),AHH(12),IMP(12),IFREQ(12),KNOW(12),
3.000      , LOC(12),M(12),TT(12),TA(12),TI(12),TS(12),TD(12),TF(12)
4.000      COMMON/CRIT/ISSET,NNOBJ,KKEY(40),NFILE,ITOT,NINF
4.100      DIMENSION AP(12),TP(12),SJ(12),TN(12),RH(12),TH(12),DH(12)
5.000 C-----
6.000 C      SELECT INPUT PATTERN TYPE
7.000 C-----
8.000      IF(NF1.NE.16) GO TO 60
9.000 C-----
10.000 C      INPUT FEASIBLE PATTERN DATA FOR NON-INFERIOR PATTERNS
11.000 C-----
12.000      25 READ(NF2,105,END=1005)IOBS,KHHN,KPN,KN
13.000      105 FORMAT(5I5)
14.000      IF(IOBS.EQ.9999)GO TO 1010
15.000      DO 50 J=1,N
16.000      50 READ(NF2,115)K,AH(J),AHH(J),IMP(J),IFREQ(J),KNOW(J),
17.000      , LOC(J),M(J),TT(J),TA(J),TI(J),TS(J),TD(J),TF(J)
18.000      115 FORMAT(2(2X,I2),4I3,2(I4,1X),F5.2,2X,5F7.2)
19.000      IF(KK.EQ.NINF) RETURN
20.000      GO TO 25
21.000 C
22.000      1005 WRITE(108,205)NF2,KHHN,KPN
23.000      205 FORMAT(//' *** EOF ON UNIT ',I3,3H***,5X,'(HOUSEHOLD ',
24.000      , I5,' INDIVIDUAL ',I5,1H)//)
25.000      STOP 3
26.000      1010 WRITE(108,210)KHHN,KPN,NINF
27.000      210 FORMAT(//' *** DATA ERROR ***',6X,'(HOUSEHOL ',I5,3X,
28.000      , 'INDIVIDUAL ',I5,1H)/6X,'NON-INFERIOR PATTERN ',J5//)
29.000      STOP 4
30.000 C-----
31.000 C      INPUT GROOPED PATTERN DATA
32.000 C-----
32.100 C      READ(NF2) INDIVIDUAL HEADER -- SR CHUCKER
33.000      60 READ(NF2,105,END=1025)NFEAS,NA,NCHAR,N
34.000 C      (NFEAS = NO. OF FEASIBLE PATTERNS RAPS ARE BASED ON)
35.000 C      (NA = PLANNED ACTIVITIES      NCHAR = CHARACTERISTICS)
36.000 C      (N = NUMBER OF REPRESENTATIVE PATTERNS)
36.100      I=1
37.000      65 READ(52,120)KG,MINHAF,
38.000      , (AP(J),TP(J),SJ(J),TN(J),TT(J),TI(J),TS(J),TD(J),M(I),
38.100      , RH(J),TH(J),DH(J),LOC(J),AHH(J),IMP(J),AH(J),J=1,NA)
39.000      120 FORMAT(2I4,4F3.0,2F5.2,2F6.2,2F3.0,2F5.2,2F5.0,2F3.0/
40.000      , (8X,4F3.0,2F5.2,2F6.2,2F3.0,2F5.2,2F5.0,2F3.0))
41.000      IF(KG.EQ.NINF) RETURN
42.000      I=I+1
43.000      GO TO 65
44.000 C-----
45.000      1025 STOP
46.000      END

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APPENDIX B

WINDHAM CODING FORM

CODING MANUAL1979-80 WINDHAM REGIONAL SURVEY RESULTS

Transportation Institute
University of Connecticut
Storrs, Connecticut

Note: This manual was developed as a part of the work conducted on UMTA University Research and Training Grant CE-11-0001. It is intended as assistance to the user of the data tape of the home interview survey results. The manual itself is privileged information and is not intended for publication. Users are advised that the information on the data tape was collected with the understanding that it would be held in strictest confidentiality and would be used in aggregate form only.

Card Type 1 - Household InformationCol. 1 - Card typeCols. 2-3 - Interviewer numberCols. 4-7 - Sample numberCols. 8-10 - Town number

<u>Town</u>	<u>Number</u>
Ashford	801
Chaplin	804
Columbia	703
Coventry	704
Hampton	806
Lebanon	607
Mansfield	707
Scotland	811
Willington	713
Windham	814

Col. 11 - Race

- 1 = White
- 2 = Black
- 3 = Hispanic
- 4 = Other

Cols. 12-15 - Time began interviewCols. 16-19 - Time ended interviewCol. 20 - Statement of voluntary participation

- 1 No
- 2 Yes

- Col. 21 - Day of week for which information is reported
- Cols. 22-25 - Month and day for which information is reported.
- Cols. 26-27 - Seating capacity for auto number 1
- Cols. 28-37 - Seating capacities for autos number 2 through 6
- Cols. 38-45 - Seating capacities for vans number 1 through 4
- Cols. 46-51 - Seating capacities for trucks number 1 through 3
- Cols. 52-53 - Motorcycles
- Cols. 54-55 - Seating capacity of other vehicles
- Cols. 56-57 - Blank
- Col. 58 - Income category

- 1 = Under \$6,000
- 2 = \$ 6,000 - \$ 9,999
- 3 = \$10,000 - \$14,999
- 4 = \$15,000 - \$19,999
- 5 = \$20,000 - \$24,999
- 6 = \$25,000 and Over

- Col. 59 - Physically handicapped

"Are there any physically handicapped persons in this household who would need special assistance in traveling to and from activities?"

- 1 = No
- 2 = Yes

- Cols. 72-73 - *Life Cycle Group*
- Cols. 74-75 - Interviewer number
- Cols. 76-78 - Questionnaire number
- Cols. 79-80 - Card sequence number

Card Type 2 -- Person information

Col. 1 - Card type

Cols. 2, 11, ..., 65 - Person number

1 to 8

Cols 3, 12, ..., 66 - Sex

1 = Male

2 = Female

9 = Student

Cols. 4 and 5, 13 and 14, ... 67 and 68 - Age

Cols. 6 and 7, 15 and 16, ... 69 and 70 - Education

Cols. 8, 17, ..., 71 - Driver?

1 = No or Not applicable

2 = Yes

Cols. 9, 18, ..., 72 - Employed?

1 = No or Not applicable

2 = Yes

Cols. 10, 19, ..., 73 - Relation to respondent

1 = Husband

2 = Wife

3 = Child

4 = Parent

5 = In-law

6 = Grandparent

7 = Grandchild

8 = Other relative

9 = Unrelated individual

Cols. 74-75 - Interviewer number

Cols. 76-78 - Questionnaire number

Cols. 79-80 - Card sequence number

Card Type 3 - Activity Information

One of these cards is completed for every activity.

Col. 1 - Card type

Cols. 2-3 - Number of activities in tour

The activity card for the first activity in any tour is also used to indicate the number of activities in that tour. For any activity except the first, this field is coded 00.

Cols. 4-5 - Type of activity

- W 1 = work
- SE 2 = theater, movie, etc.
- 3 = spectator sports
- 4 = participatory sports
- 5 = other recreation
- 6 = ^{major shopping} grocery, (small item shopping, banking, post office)
- So 7 = clothes, appliance shopping
- 8 = other shopping
- 9 = church
- 10 = school
- 11 = after school activity
- 12 = voluntary association
- 13 = public meeting
- 14 = restaurant
- 15 = medical, dental, legal appointment
- 16 = return home
- 17 = pickup/dropoff
- 18 = other
- 18 = minor shopping ←
- 19 = other

Cols. 6-11 - Origin

Six digit code for node closest to origin of trip to the reported activity

Cols. 12-17 - Destination

Six digit code for node closest to the location of the activity

- Cols. 18-21 - Time started for activity
24-hr time at which traveler left previous activity to go to this activity
- Cols. 22-25 - Time arrived at activity
- Col. 26 - Frequency of activity
1 = Daily
2 = At least once-a-week but not daily
3 = At least once-a-month but not weekly
4 = Less than once-a-month
- Cols. 27-28 - Mode of transportation
1-14 = Household private vehicle number
15 = Passenger in private vehicle from another household
16 = Publicly-owned automobile (state or local government)
17 = Public transportation
18 = Company-owned vehicle
19 = Walked
20 = Other
- Cols. 29-30 - Number of other persons from this household on this trip
- Cols. 31-32 - Number of other persons from another household on this trip
- Cols. 33-36 - Earliest time could leave home to go to this activity
This question was asked only for the first activity in a tour.
For all other activities this field will be blank.
- Cols. 37-40 - Latest time could return home.
This question was asked only for the return home activity.
- Cols. 41-44 - Starting time for activities with a fixed starting time
- Cols. 45-48 - Ending time for activities with a fixed ending time
- Cols. 49-51 - Time willing to wait at activity before starting activity
- Cols. 52-54 - Time willing to wait at activity after completing activity
- Cols. 55-59 - Importance, flexibility, etc. as indicated by answers to questions listed below:

1. How important do you think this activity is for the well-being of your household?

1. Very important	4. Unimportant (not important)
2. Important	5. Don't Know
3. Relatively unimportant	0. Not Applicable (Return home)

2. Would it be possible for this activity to have occurred on a different day?

1. Yes	9. Don't Know
2. No	0. Not Applicable (Return home)

3. Would it be possible to complete this activity at a place closer to your home?

1. Yes	9. Don't Know
2. No	0. Not Applicable

4. Which of the following best describes the reason for traveling a longer distance to complete this activity?
 1. Personal desires.
 2. Lower costs of products or services.
 3. Better selection of products or services.
 4. Traditional place to go.
 5. Activity was part of a series and not too far out of the way.
 6. Shared ride with someone who wanted to stop there.
 7. Served by mass transportation or other public motor vehicle.
 8. Other (Explain) _____
 9. Don't Know.
 0. Not Applicable (Responses 2, 9, and 0 to question 3).

5. How long ahead of time did (you/they) know that this activity would occur? (Interviewer code)
 1. No advance knowledge of time.
 2. Less than one hour.
 3. One to two hours.
 4. Two to four hours.
 5. Same day but over four hours.
 6. 24 to 48 hours.
 7. Over 48 hours but less than one week.
 8. Over one week.
 9. Don't Know.
 0. Not Applicable (Return home).

Col. 62 - Person-number

Col. 63 - Serve passenger?
 1 = Yes, 2 = No

Col. 64 - Accompany driver?
 1 = Yes, 2 = No

Col. ~~72-78~~ ⁶⁵⁻⁶⁸ ACTIVITY DURATION
 Cols. ~~74-80~~ ⁷⁴⁻⁸⁰ - Sequence number as on card type 1.

Card Type 4 - Responses to Scenario Questions

Col. 1 - Card type

Cols. 2, 5, 8, ... 53 - Rider

Cols. 3, 6, 9, ... 54 - Driver

Cols. 4, 7, 10, ... 55 - Child

These cards indicate the respondent's willingness to participate in a ridesharing program as a rider, a driver or allowing his child under 12 years of age to participate. There were 18 different scenarios described as indicated on the following two pages. Responses are coded according to:

- 1 = No
- 2 = Yes
- 3 = Don't Know
- 4 = Not Applicable

Cols. 74-80 - Sequence number as on type 1.

APPENDIX C

SMOOPER SAMPLE OUTPUT

2	1	1	0	0	0	255	1	1	.17	1	17.07	.00	17.07	1.00	18.73	.00
3	2	6	1	2	6	256	1	1	.08	1	15.83	.00	15.83	1.00	16.83	5.00
4	3	16	0	0	0	263	1	1	.08	1	16.91	1.09	18.00	1.00	19.00	.00

PATTERN 10 OBJECTIVES

TRAVEL TIME	.1600E+00	.1700E+00	.0000E+00	.0000E+00	.1700E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.2050E+02	.0000E+00	.0000E+00		
POTENTIAL	.1571E+01	.4614E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

HOUSEHOLD 56 INDIVIDUAL 1 RAP 3 FEASIBLE PATTERN 13

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	4	2	2	8	258	1	.17	12.50	.00	12.50	2.00	14.50	10.00
2	2	6	1	2	6	256	1	.17	14.67	.00	14.67	1.00	15.67	5.00
3	0	16	0	0	0	263	1	.08	15.75	.00	15.75	2.17	17.92	.00
4	3	16	0	0	0	263	1	.08	18.00	.00	18.00	1.00	19.00	.00

PATTERN 13 OBJECTIVES

TRAVEL TIME	.2500E+00	.1700E+00	.0000E+00	.0000E+00	.8000E-01
WAIT TIME	.0000E+00				
TIME AT HOME	.2050E+02	.0000E+00	.0000E+00		
POTENTIAL	.1142E+01	.3344E+00			
PATTERN RISK	.1000E+01	.0000E+00	.0000E+00	.0000E+00	

HOUSEHOLD 56 INDIVIDUAL 1 RAP 4 FEASIBLE PATTERN 17

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	4	2	2	8	258	1	.17	12.50	.00	12.50	2.00	14.50	10.00
2	3	16	0	0	0	263	1	.17	14.67	3.33	18.00	1.00	19.00	.00
3	0	16	0	0	0	263	1	.08	19.08	.00	19.08	.91	20.00	.00
4	2	6	1	2	6	256	1	.08	20.08	.00	20.08	1.00	21.08	5.00
5	0	16	0	0	0	263	1	.08	21.16	.00	21.16	.00	.00	.00

PATTERN 17 OBJECTIVES

TRAVEL TIME	.3300E+00	.1700E+00	.0000E+00	.0000E+00	.8000E-01
WAIT TIME	.0000E+00				
TIME AT HOME	.2042E+02	.0000E+00	.0000E+00		
POTENTIAL	.1439E+01	.4041E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

HOUSEHOLD 56 INDIVIDUAL 1 RAP 5 FEASIBLE PATTERN 23

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	2	6	1	2	6	256	1	.08	10.67	.00	10.67	1.00	11.67	5.00

1 0 1 0 0 0 0 263 1 1 .17 1 14.67 .00 14.67 3.25 17.921 .001
 1 4 1 3 16 0 0 0 263 1 1 .08 1 18.00 .00 18.00 1.00 19.001 .001

PATTERN 23 OBJECTIVES

TRAVEL TIME .1600E+00 .1700E+00 .0000E+00 .0000E+00 .1700E+00
 WAIT TIME .6700E+00
 TIME AT HOME .1984E+02 .0000E+00 .0000E+00
 POTENTIAL .7140E+00 .2073E+00
 PATTERN RISK .0000E+00 .1000E+01 .0000E+00 .0000E+00

HOUSEHOLD 56 INDIVIDUAL 1 RAP 6 FEASIBLE PATTERN 29

I	ACTIVITY							I	TRAVEL	TEMPORAL SPECIFICATIONS					I	TIME
	IND	TP	IM	FR	KN	ZONE	MODE			TIME	ARRIVAL	IDLE	START	LENGTH		
1	1	4	2	2	8	258	1	1	.17	12.50	.00	12.50	2.00	14.50	10.00	
2	0	16	0	0	0	263	1	1	.17	14.67	.00	14.67	3.25	17.92	.00	
3	3	16	0	0	0	263	1	1	.08	18.00	.00	18.00	1.00	19.00	.00	
4	0	16	0	0	0	263	1	1	.08	19.08	.00	19.08	.91	20.00	.00	
5	2	6	1	2	6	256	1	1	.08	20.08	.00	20.08	1.00	21.08	5.00	
6	0	16	0	0	0	263	1	1	.08	21.16	.00	21.16	.00	.00	.00	

PATTERN 29 OBJECTIVES

TRAVEL TIME .2400E+00 .1700E+00 .0000E+00 .0000E+00 .2500E+00
 WAIT TIME .0000E+00
 TIME AT HOME .2034E+02 .0000E+00 .0000E+00
 POTENTIAL .1439E+01 .4041E+00
 PATTERN RISK .1000E+01 .0000E+00 .0000E+00 .0000E+00

*** PATTERN 32 CLOSEST TO OBSERVED ***

HOUSEHOLD 56 INDIVIDUAL 1 RAP 7 FEASIBLE PATTERN 32

I	ACTIVITY							I	TRAVEL	TEMPORAL SPECIFICATIONS					I	TIME
	IND	TP	IM	FR	KN	ZONE	MODE			TIME	ARRIVAL	IDLE	START	LENGTH		
1	2	6	1	2	6	256	1	1	.08	10.00	.00	10.00	1.00	11.00	5.00	
2	0	16	0	0	0	263	1	1	.08	11.08	.00	11.08	1.25	12.33	.00	
3	1	4	2	2	8	258	1	1	.17	12.50	.00	12.50	2.00	14.50	10.00	
4	0	16	0	0	0	263	1	1	.17	14.67	.00	14.67	3.25	17.92	.00	
5	3	16	0	0	0	263	1	1	.08	18.00	.00	18.00	1.00	19.00	.00	

PATTERN 32 OBJECTIVES

TRAVEL TIME .1600E+00 .1700E+00 .0000E+00 .0000E+00 .2500E+00
 WAIT TIME .0000E+00
 TIME AT HOME .2042E+02 .0000E+00 .0000E+00
 POTENTIAL .1142E+01 .3344E+00
 PATTERN RISK .0000E+00 .2000E-01 .0000E+00 .0000E+00

 * HOUSEHOLD 67 *

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* HOME LOCATION          21 *
* TRAVEL DAY START      9.00 *
* TRAVEL DAY END        24.00 *
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** OBJECTIVES WILL BE COMPUTED FOR 7 REPRESENTATIVE PATTERNS
(BASED ON 92 FEASIBLE PATTERNS)

HOUSEHOLD 67 INDIVIDUAL 1 RAP 1 FEASIBLE PATTERN 3															

ACTIVITY TRAVEL TEMPORAL SPECIFICATIONS TIME															
----- ----- ----- ----- FROM															
INO TP IM FR KN ZONE MODE TIME ARRIVAL IDLE START LENGTH FINISH HOME															
----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----															
1	1	6	3	4	0	283	1	1	.92	10.91	.00	10.91	1.75	12.66	155.00
2	2	6	3	4	0	286	1	1	.50	13.16	.00	13.16	.92	14.08	160.00
3	3	16	0	0	0	21	1	1	1.00	15.08	1.92	17.00	2.00	19.00	.00

PATTERN 3 OBJECTIVES

TRAVEL TIME	.1000E+01	.0000E+00	.1420E+01	.0000E+00	.0000E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.4070E+01	.0000E+00	.1484E+02		
POTENTIAL	.7140E+00	.3706E+00			
PATTERN RISK	.0000E+00	.1000E+01	.1000E+01	.0000E+00	

HOUSEHOLD 67 INDIVIDUAL 1 RAP 2 FEASIBLE PATTERN 18															

ACTIVITY TRAVEL TEMPORAL SPECIFICATIONS TIME															
----- ----- ----- ----- FROM															
INO TP IM FR KN ZONE MODE TIME ARRIVAL IDLE START LENGTH FINISH HOME															
----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----															
1	2	6	3	4	0	286	1	1	1.00	12.03	.00	12.03	.92	12.95	160.00
2	3	16	0	0	0	21	1	1	1.00	13.95	3.05	17.00	2.00	19.00	.00
3	1	6	3	4	0	283	1	1	.92	19.92	.00	19.92	1.75	21.67	155.00
4	0	16	0	0	0	21	1	1	.92	22.58	.00	22.58	.00	.00	.00

PATTERN 18 OBJECTIVES

TRAVEL TIME	.1920E+01	.0000E+00	.1920E+01	.0000E+00	.0000E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.6240E+01	.0000E+00	.1126E+02		
POTENTIAL	.1107E+01	.5764E+00			
PATTERN RISK	.0000E+00	.1000E+01	.3636E+00	.0000E+00	

HOUSEHOLD 67 INDIVIDUAL 1 RAP 3 FEASIBLE PATTERN 28															

ACTIVITY TRAVEL TEMPORAL SPECIFICATIONS TIME															
----- ----- ----- ----- FROM															
INO TP IM FR KN ZONE MODE TIME ARRIVAL IDLE START LENGTH FINISH HOME															
----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----															
1	1	6	3	4	0	283	1	1	.92	9.60	.00	9.60	1.75	11.35	155.00
2	0	16	0	0	0	21	1	1	.92	12.27	.00	12.27	1.20	13.47	.00
3	2	6	3	4	0	286	1	1	1.00	14.47	.00	14.47	.92	15.39	160.00
4	3	16	0	0	0	21	1	1	1.00	16.39	.61	17.00	2.00	19.00	.00

TRAVEL TIME .1000E+01 .0000E+00 .1920E+01 .0000E+00 .9200E+00
 WAIT TIME .0000E+00
 TIME AT HOME .2650E+01 .0000E+00 .1484E+02
 POTENTIAL .1153E+01 .1021E+01
 PATTERN RISK .0000E+00 .6100E+00 .1000E+01 .0000E+00

HOUSEHOLD 67 INDIVIDUAL 1 RAP 4 FEASIBLE PATTERN 47

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
INO	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	6	3	4	0	283	1	.92	11.66	.00	11.66	1.75	13.41	155.00
2	3	16	0	0	0	21	1	.92	14.33	2.67	17.00	2.00	19.00	.00
3	0	16	0	0	0	21	1	.08	19.08	.00	19.08	.25	19.33	.00
4	2	6	3	4	0	286	1	1.00	20.33	.00	20.33	.92	21.25	160.00
5	0	16	0	0	0	21	1	1.00	22.25	.00	22.25	.00	.00	.00

PATTERN 47 OBJECTIVES

TRAVEL TIME .1920E+01 .0000E+00 .1920E+01 .0000E+00 .8000E-01
 WAIT TIME .0000E+00
 TIME AT HOME .5570E+01 .0000E+00 .1184E+02
 POTENTIAL .9057E+00 .3672E+00
 PATTERN RISK .0000E+00 .1000E+01 .7500E+00 .0000E+00

HOUSEHOLD 67 INDIVIDUAL 1 RAP 5 FEASIBLE PATTERN 68

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
INO	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	2	6	3	4	0	286	1	1.00	10.25	.00	10.25	.92	11.17	160.00
2	0	16	0	0	0	21	1	1.00	12.17	.00	12.17	.62	12.79	.00
3	1	6	3	4	0	283	1	.92	13.70	.00	13.70	1.75	15.45	155.00
4	3	16	0	0	0	21	1	.92	16.37	.63	17.00	2.00	19.00	.00

PATTERN 68 OBJECTIVES

TRAVEL TIME .9200E+00 .0000E+00 .1920E+01 .0000E+00 .1000E+01
 WAIT TIME .0000E+00
 TIME AT HOME .2650E+01 .0000E+00 .1484E+02
 POTENTIAL .7494E+00 .3299E+00
 PATTERN RISK .0000E+00 .6909E+00 .1000E+01 .0000E+00

HOUSEHOLD 67 INDIVIDUAL 1 RAP 6 FEASIBLE PATTERN 79

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
INO	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	2	6	3	4	0	286	1	1.00	12.03	.00	12.03	.92	12.95	160.00
2	3	16	0	0	0	21	1	1.00	13.95	3.05	17.00	2.00	19.00	.00
3	0	16	0	0	0	21	1	.08	19.08	.00	19.08	.00	19.08	.00
4	1	6	3	4	0	283	1	.92	20.00	.00	20.00	1.75	21.75	155.00
5	0	16	0	0	0	21	1	.92	22.67	.00	22.67	.00	.00	.00

PATTERN 79 OBJECTIVES

WAIT TIME .0000E+00
 TIME AT HOME -.3551E+02 .0000E+00 .9840E+01
 POTENTIAL .1107E+01 .5764E+00
 PATTERN RISK .0000E+00 .1000E+01 .2764E+00 .0000E+00

*** PATTERN 87 CLOSEST TO OBSERVED ***

HOUSEHOLD		67 INDIVIDUAL						1		RAP		7 FEASIBLE PATTERN				87	
		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS				TIME			
		IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	FROM	
1	1	1	6	3	4	0	283	1	.92	9.00	.00	9.00	1.75	10.75	155.00		
1	2	0	16	0	0	0	21	1	.92	11.67	.00	11.67	5.25	16.92	.00		
1	3	3	16	0	0	0	21	1	.08	17.00	.00	17.00	2.00	19.00	.00		
1	4	0	16	0	0	0	21	1	.08	19.08	.00	19.08	.25	19.33	.00		
1	5	2	6	3	4	0	286	1	1.00	20.33	.00	20.33	.92	21.25	160.00		
1	6	0	16	0	0	0	21	1	1.00	22.25	.00	22.25	.00	.00	.00		

PATTERN 87 OBJECTIVES

TRAVEL TIME .1080E+01 .0000E+00 .1920E+01 .0000E+00 .1000E+01
 WAIT TIME .0000E+00
 TIME AT HOME .5490E+01 .0000E+00 .1184E+02
 POTENTIAL .7140E+00 .2925E+00
 PATTERN RISK .0000E+00 .0000E+00 .7500E+00 .0000E+00

 * HOUSEHOLD 74 *

 * INDIVIDUAL 1 *
 * PLANNED ACTIVITIES 4 *
 * HOME LOCATION 41 *
 * TRAVEL DAY START 7.25 *
 * TRAVEL DAY END 24.00 *

** OBJECTIVES WILL BE COMPUTED FOR 7 REPRESENTATIVE PATTERNS
 (BASED ON 260 FEASIBLE PATTERNS)

HOUSEHOLD		74 INDIVIDUAL						1		RAP		1 FEASIBLE PATTERN				11	
		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS				TIME			
		IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	FROM	
1	1	1	1	4	2	0	257	1	.25	8.00	.00	8.00	7.25	15.25	115.00		
1	2	0	16	0	0	0	41	1	.25	15.50	.00	15.50	1.42	16.92	.00		
1	3	2	6	1	2	6	256	1	.25	17.17	.00	17.17	.33	17.50	115.00		
1	4	3	6	1	2	7	38	1	.17	17.66	.00	17.66	.25	17.91	5.00		
1	5	4	16	0	0	0	41	1	.08	18.00	.00	18.00	1.00	19.00	.00		

PATTERN 11 OBJECTIVES

TIME AT HOME .1700E+00 .2090E+01 .1291E+02
 POTENTIAL .1142E+01 .4462E+00
 PATTERN RISK .2000E+01 .8002E-01 .0000E+00 .0000E+00

HOUSEHOLD 74 INDIVIDUAL 1 RAP 2 FEASIBLE PATTERN 45

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	4	2	0	257	1	.25	8.00	.00	8.00	7.25	15.25	15.00
2	3	6	1	2	7	38	1	.25	15.50	.00	15.50	.25	15.75	5.00
3	0	16	0	0	0	41	1	.08	15.83	.00	15.83	2.08	17.92	.00
4	4	16	0	0	0	41	1	.08	18.00	.00	18.00	1.00	19.00	.00
5	2	6	1	2	6	256	1	.25	19.25	.00	19.25	.33	19.58	15.00
6	0	16	0	0	0	41	1	.25	19.83	.00	19.83	.00	.00	.00

PATTERN 45 OBJECTIVES

TRAVEL TIME .8300E+00 .0000E+00 .0000E+00 .2500E+00 .8000E-01
 WAIT TIME .0000E+00
 TIME AT HOME .5000E+00 .2430E+01 .1208E+02
 POTENTIAL .1129E+01 .3557E+00
 PATTERN RISK .2000E+01 .0000E+00 .0000E+00 .0000E+00

HOUSEHOLD 74 INDIVIDUAL 1 RAP 3 FEASIBLE PATTERN 108

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	4	2	0	257	1	.25	8.00	.00	8.00	7.25	15.25	15.00
2	0	16	0	0	0	41	1	.25	15.50	.00	15.50	1.25	16.75	.00
3	2	6	1	2	6	256	1	.25	17.00	.00	17.00	.33	17.33	15.00
4	4	16	0	0	0	41	1	.25	17.58	.42	18.00	1.00	19.00	.00
5	0	16	0	0	0	41	1	.08	19.08	.00	19.08	1.29	20.37	.00
6	3	6	1	2	7	38	1	.08	20.46	.00	20.46	.25	20.71	5.00
7	0	16	0	0	0	41	1	.08	20.79	.00	20.79	.00	.00	.00

PATTERN 108 OBJECTIVES

TRAVEL TIME .6600E+00 .0000E+00 .0000E+00 .2500E+00 .3300E+00
 WAIT TIME .0000E+00
 TIME AT HOME .0000E+00 .2510E+01 .1242E+02
 POTENTIAL .8263E+00 .2913E+00
 PATTERN RISK .2000E+01 .1000E+01 .0000E+00 .0000E+00

HOUSEHOLD 74 INDIVIDUAL 1 RAP 4 FEASIBLE PATTERN 117

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	4	2	0	257	1	.25	8.00	.00	8.00	7.25	15.25	15.00
2	2	6	1	2	6	256	1	.08	15.33	.00	15.33	.33	15.66	15.00
3	0	16	0	0	0	41	1	.25	15.91	.00	15.91	2.00	17.92	.00
4	4	16	0	0	0	41	1	.08	18.00	.00	18.00	1.00	19.00	.00
5	0	16	0	0	0	41	1	.08	19.08	.00	19.08	.64	19.73	.00
6	3	6	1	2	7	38	1	.08	19.81	.00	19.81	.25	20.06	5.00

TRAVEL TIME	.3200E+00	.0000E+00	.0000E+00	.2500E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.5000E+00	.2350E+01	.1242E+02		
POTENTIAL	.9405E+00	.2447E+00			
PATTERN RISK	.2000E+01	.0000E+00	.0000E+00	.0000E+00	

*** PATTERN 131 CLOSEST TO OBSERVED ***

HOUSEHOLD 74 INDIVIDUAL 1 RAP 5 FEASIBLE PATTERN 131

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	4	2	0	257	1	.25	8.00	.00	8.00	7.25	15.25	15.00
2	0	16	0	0	0	41	1	.25	15.50	.00	15.50	.63	16.13	.00
3	3	6	1	2	7	38	1	.08	16.21	.00	16.21	.25	16.46	5.00
4	0	16	0	0	0	41	1	.08	16.54	.00	16.54	.31	16.85	.00
5	2	6	1	2	6	256	1	.25	17.10	.00	17.10	.33	17.43	15.00
6	4	16	0	0	0	41	1	.25	17.68	.32	18.00	1.00	19.00	.00

PATTERN 131 OBJECTIVES

TRAVEL TIME	.5800E+00	.0000E+00	.0000E+00	.2500E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1000E+00	.2000E+01	.1291E+02		
POTENTIAL	.7140E+00	.1442E+00			
PATTERN RISK	.2000E+01	.1000E+01	.0000E+00	.0000E+00	

HOUSEHOLD 74 INDIVIDUAL 1 RAP 6 FEASIBLE PATTERN 156

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	4	2	0	257	1	.25	8.00	.00	8.00	7.25	15.25	15.00
2	0	16	0	0	0	41	1	.25	15.50	.00	15.50	1.56	17.06	.00
3	3	6	1	2	7	38	1	.08	17.14	.00	17.14	.25	17.39	5.00
4	4	16	0	0	0	41	1	.08	17.48	.52	18.00	1.00	19.00	.00
5	0	16	0	0	0	41	1	.08	19.08	.00	19.08	1.17	20.25	.00
6	2	6	1	2	6	256	1	.25	20.50	.00	20.50	.33	20.83	15.00
7	0	16	0	0	0	41	1	.25	21.08	.00	21.08	.00	.00	.00

PATTERN 156 OBJECTIVES

TRAVEL TIME	.6600E+00	.0000E+00	.0000E+00	.2500E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.3100E+00	.2610E+01	.1200E+02		
POTENTIAL	.9590E+00	.1770E+00			
PATTERN RISK	.2000E+01	.1000E+01	.0000E+00	.0000E+00	

HOUSEHOLD 74 INDIVIDUAL 1 RAP 7 FEASIBLE PATTERN 209

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME				
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME

1	1	1	4	2	0	257	1	1	.25	8.00	.00	8.00	7.25	15.25	15.00	111
1	2	4	16	0	0	41	1	1	.25	15.50	2.50	18.00	1.00	19.00	.00	
1	3	0	16	0	0	41	1	1	.08	19.08	.00	19.08	.48	19.56	.00	
1	4	3	6	1	2	7	38	1	.08	19.65	.00	19.65	.25	19.90	5.00	
1	5	0	16	0	0	41	1	1	.08	19.98	.00	19.98	.00	19.98	.00	
1	6	2	6	1	2	6	256	1	.25	20.23	.00	20.23	.33	20.56	15.00	
1	7	0	16	0	0	41	1	1	.25	20.81	.00	20.81	.00	.00	.00	

PATTERN 209 OBJECTIVES

TRAVEL TIME	.8300E+00	.0000E+00	.0000E+00	.2500E+00	.1600E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.5000E+00	.2840E+01	.1159E+02		
POTENTIAL	.8568E+00	.1737E+00			
PATTERN RISK	.2000E+01	.1000E+01	.0000E+00	.0000E+00	

* HOUSEHOLD 82 *

* INDIVIDUAL 1 *
* PLANNED ACTIVITIES 4 *
* HOME LOCATION 211 *
* TRAVEL DAY START 6.75 *
* TRAVEL DAY END 24.00 *

** OBJECTIVES WILL BE COMPUTED FOR 6 REPRESENTATIVE PATTERNS
(BASED ON 40 FEASIBLE PATTERNS)

HOUSEHOLD 82 INDIVIDUAL 1 RAP 1 FEASIBLE PATTERN 5

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME						
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME		
1	1	1	0	1	0	203	1	.08	7.25	.00	7.25	1.75	9.00	5.00	
1	2	0	16	0	0	211	1	.08	9.08	.00	9.08	1.62	10.70	.00	
1	3	2	5	4	2	6	210	1	.08	10.79	.00	10.79	2.25	13.04	5.00
1	4	3	16	0	0	0	211	1	.08	13.12	1.63	14.75	.50	15.25	.00
1	5	4	16	0	0	0	211	1	.08	15.33	.92	16.25	2.00	18.25	.00

PATTERN 5 OBJECTIVES

TRAVEL TIME	.2400E+00	.0000E+00	.0000E+00	.8000E-01	.8000E-01
WAIT TIME	.0000E+00				
TIME AT HOME	.3260E+01	.2840E+01	.1350E+02		
POTENTIAL	.7140E+00	.2616E+00			
PATTERN RISK	.0000E+00	.2000E+01	.0000E+00	.1000E+01	

HOUSEHOLD 82 INDIVIDUAL 1 RAP 2 FEASIBLE PATTERN 20

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS					TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	0	1	0	203	1	.08	7.25	.00	7.25	1.75	9.00	5.00

4	3	16	0	0	0	211	1	.08	13.12	1.63	14.75	.50	15.25	.00	112
5	0	16	0	0	0	211	1	.08	15.33	.00	15.33	.83	16.17	.00	
6	4	16	0	0	0	211	1	.08	16.25	.00	16.25	2.00	18.25	.00	

PATTERN 20 OBJECTIVES

TRAVEL TIME	.2400E+00	.0000E+00	.0000E+00	.8000E-01	.1600E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.3260E+01	.2760E+01	.1350E+02		
POTENTIAL	.1142E+01	.4134E+00			
PATTERN RISK	.0000E+00	.1000E+01	.0000E+00	.1000E+01	

*** PATTERN 23 CLOSEST TO OBSERVED ***

HOUSEHOLD 82 INDIVIDUAL 1 RAP 3 FEASIBLE PATTERN 23

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS				TIME						
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	0	1	0	203	1	.08	7.25	.00	7.25	1.75	9.00	5.00
2	2	5	4	2	6	210	1	.08	9.08	.00	9.08	2.25	11.33	5.00
3	0	16	0	0	0	211	1	.08	11.42	.00	11.42	3.25	14.67	.00
4	3	16	0	0	0	211	1	.08	14.75	.00	14.75	.50	15.25	.00
5	0	16	0	0	0	211	1	.08	15.33	.00	15.33	.83	16.17	.00
6	4	16	0	0	0	211	1	.08	16.25	.00	16.25	2.00	18.25	.00

PATTERN 23 OBJECTIVES

TRAVEL TIME	.2400E+00	.0000E+00	.0000E+00	.8000E-01	.1600E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.3250E+01	.2760E+01	.1350E+02		
POTENTIAL	.1428E+01	.5231E+00			
PATTERN RISK	.0000E+00	.0000E+00	.0000E+00	.1000E+01	

HOUSEHOLD 82 INDIVIDUAL 1 RAP 4 FEASIBLE PATTERN 27

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS				TIME						
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	0	1	0	203	1	.08	7.25	.00	7.25	1.75	9.00	5.00
2	0	16	0	0	0	211	1	.08	9.08	.00	9.08	5.58	14.67	.00
3	3	16	0	0	0	211	1	.08	14.75	.00	14.75	.50	15.25	.00
4	4	16	0	0	0	211	1	.08	15.33	.92	16.25	2.00	18.25	.00
5	0	16	0	0	0	211	1	.08	18.33	.00	18.33	1.66	20.00	.00
6	2	5	4	2	6	210	1	.08	20.08	.00	20.08	2.25	22.33	5.00
7	0	16	0	0	0	211	1	.08	22.41	.00	22.41	.00	.00	.00

PATTERN 27 OBJECTIVES

TRAVEL TIME	.3200E+00	.0000E+00	.0000E+00	.8000E-01	.1600E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.5590E+01	.2840E+01	.1101E+02		
POTENTIAL	.1142E+01	.4134E+00			
PATTERN RISK	.0000E+00	.1000E+01	.0000E+00	.1000E+01	

ACTIVITY							TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	0	1	0	203	1	.08	7.25	.00	7.25	1.75	9.00	5.00
2	3	16	0	0	0	211	1	.08	9.08	5.67	14.75	.50	15.25	.00
3	0	16	0	0	0	211	1	.08	15.33	.00	15.33	.83	16.17	.00
4	4	16	0	0	0	211	1	.08	16.25	.00	16.25	2.00	18.25	.00
5	0	16	0	0	0	211	1	.08	18.33	.00	18.33	1.66	20.00	.00
6	2	5	4	2	6	210	1	.08	20.08	.00	20.08	2.25	22.33	5.00
7	0	16	0	0	0	211	1	.08	22.41	.00	22.41	.00	.00	.00

PATTERN 32 OBJECTIVES

TRAVEL TIME	.3200E+00	.0000E+00	.0000E+00	.8000E-01	.1600E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.5670E+01	.2760E+01	.1101E+02		
POTENTIAL	.1142E+01	.4134E+00			
PATTERN RISK	.0000E+00	.1000E+01	.0000E+00	.1000E+01	

HOUSEHOLD 82 INDIVIDUAL 1 RAP 6 FEASIBLE PATTERN 38

ACTIVITY							TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	0	1	0	203	1	.08	7.25	.00	7.25	1.75	9.00	5.00
2	0	16	0	0	0	211	1	.08	9.08	.00	9.08	5.58	14.67	.00
3	3	16	0	0	0	211	1	.08	14.75	.00	14.75	.50	15.25	.00
4	0	16	0	0	0	211	1	.08	15.33	.00	15.33	.83	16.17	.00
5	4	16	0	0	0	211	1	.08	16.25	.00	16.25	2.00	18.25	.00
6	0	16	0	0	0	211	1	.08	18.33	.00	18.33	1.66	20.00	.00
7	2	5	4	2	6	210	1	.08	20.08	.00	20.08	2.25	22.33	5.00
8	0	16	0	0	0	211	1	.08	22.41	.00	22.41	.00	.00	.00

PATTERN 38 OBJECTIVES

TRAVEL TIME	.3200E+00	.0000E+00	.0000E+00	.8000E-01	.2400E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.5590E+01	.2760E+01	.1101E+02		
POTENTIAL	.1142E+01	.4134E+00			
PATTERN RISK	.0000E+00	.0000E+00	.0000E+00	.1000E+01	

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*****
* HOUSEHOLD      86      *
*****
* INDIVIDUAL     1      *
*   PLANNED ACTIVITIES     4      *
*   HOME LOCATION         208      *
*   TRAVEL DAY START       8.25    *
*   TRAVEL DAY END        24.00    *
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** OBJECTIVES WILL BE COMPUTED FOR 7 REPRESENTATIVE PATTERNS (BASED ON 71 FEASIBLE PATTERNS)

ACTIVITY										TRAVEL		TEMPORAL SPECIFICATIONS				TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME			
1	2	6	2	2	6	252	1	.33	8.50	.00	8.50	.17	8.67	20.00		
2	1	1	0	1	0	252	1	.08	8.75	.25	9.00	3.00	12.00	20.00		
3	3	1	0	0	0	252	1	.08	12.08	.92	13.00	4.00	17.00	20.00		
4	4	16	0	0	0	208	1	.33	17.33	1.17	18.50	1.00	19.50	.00		

PATTERN 5 OBJECTIVES

TRAVEL TIME	.4900E+00	.3300E+00	.0000E+00	.0000E+00	.0000E+00
WAIT TIME	.1170E+01				
TIME AT HOME	.0000E+00	.6700E+00	.1417E+02		
POTENTIAL	.7140E+00	.1511E+00			
PATTERN RISK	.2000E+01	.1000E+01	.0000E+00	.0000E+00	

HOUSEHOLD 86 INDIVIDUAL 1 RAP 2 FEASIBLE PATTERN 7

ACTIVITY										TRAVEL		TEMPORAL SPECIFICATIONS				TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME			
1	1	1	0	1	0	252	1	.33	9.00	.00	9.00	3.00	12.00	20.00		
2	0	16	0	0	0	208	1	.33	12.33	.00	12.33	.25	12.58	.00		
3	2	6	2	2	6	252	1	.33	12.92	.00	12.92	.17	13.09	20.00		
4	3	1	0	0	0	252	1	.08	13.17	.00	13.17	4.00	17.17	20.00		
5	4	16	0	0	0	208	1	.33	17.50	1.00	18.50	1.00	19.50	.00		

PATTERN 7 OBJECTIVES

TRAVEL TIME	.7400E+00	.3300E+00	.0000E+00	.0000E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.6800E+00	.7500E+00	.1400E+02		
POTENTIAL	.7140E+00	.1511E+00			
PATTERN RISK	.1000E+01	.2000E+01	.0000E+00	.0000E+00	

HOUSEHOLD 86 INDIVIDUAL 1 RAP 3 FEASIBLE PATTERN 10

ACTIVITY										TRAVEL		TEMPORAL SPECIFICATIONS				TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME			
1	1	1	0	1	0	252	1	.33	9.00	.00	9.00	3.00	12.00	20.00		
2	2	6	2	2	6	252	1	.08	12.08	.00	12.08	.17	12.25	20.00		
3	0	16	0	0	0	208	1	.33	12.59	.00	12.59	.33	12.92	.00		
4	3	1	0	0	0	252	1	.33	13.25	.00	13.25	4.00	17.25	20.00		
5	4	16	0	0	0	208	1	.33	17.58	.92	18.50	1.00	19.50	.00		

PATTERN 10 OBJECTIVES

TRAVEL TIME	.9900E+00	.8000E-01	.0000E+00	.0000E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.7500E+00	.7500E+00	.1392E+02		
POTENTIAL	.7140E+00	.1511E+00			
PATTERN RISK	.7400E+00	.1740E+01	.0000E+00	.0000E+00	

HOUSEHOLD 86 INDIVIDUAL 1 RAP 4 FEASIBLE PATTERN 29

IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	2	6	2	2	6	252	1	.33	8.25	.00	8.25	.17	8.42	20.00
2	1	1	0	1	0	252	1	.08	8.50	.50	9.00	3.00	12.00	20.00
3	0	16	0	0	0	208	1	.33	12.33	.00	12.33	.58	12.92	.00
4	3	1	0	0	0	252	1	.33	13.25	.00	13.25	4.00	17.25	20.00
5	4	16	0	0	0	208	1	.33	17.58	.92	18.50	1.00	19.50	.00

PATTERN 29 OBJECTIVES

TRAVEL TIME	.7400E+00	.3300E+00	.0000E+00	.0000E+00	.3300E+00
WAIT TIME	.5000E+00				
TIME AT HOME	.5900E+00	.4200E+00	.1392E+02		
POTENTIAL	.8998E+00	.1813E+00			
PATTERN RISK	.1740E+01	.7400E+00	.0000E+00	.0000E+00	

HOUSEHOLD 86 INDIVIDUAL 1 RAP 5 FEASIBLE PATTERN 51

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS									TIME	
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	0	1	0	252	1	.33	9.00	.00	9.00	3.00	12.00	20.00
2	0	16	0	0	0	208	1	.33	12.33	.00	12.33	.58	12.92	.00
3	3	1	0	0	0	252	1	.33	13.25	.00	13.25	4.00	17.25	20.00
4	4	16	0	0	0	208	1	.33	17.58	.92	18.50	1.00	19.50	.00
5	0	16	0	0	0	208	1	.08	19.58	.00	19.58	.95	20.54	.00
6	2	6	2	2	6	252	1	.33	20.87	.00	20.87	.17	21.04	20.00
7	0	16	0	0	0	208	1	.33	21.37	.00	21.37	.00	.00	.00

PATTERN 51 OBJECTIVES

TRAVEL TIME	.1320E+01	.3300E+00	.0000E+00	.0000E+00	.4100E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1010E+01	.7500E+00	.1301E+02		
POTENTIAL	.6116E+00	.9280E-01			
PATTERN RISK	.7400E+00	.1740E+01	.0000E+00	.0000E+00	

HOUSEHOLD 86 INDIVIDUAL 1 RAP 6 FEASIBLE PATTERN 60

ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS									TIME	
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	0	1	0	252	1	.33	9.00	.00	9.00	3.00	12.00	20.00
2	3	1	0	0	0	252	1	.08	12.08	.92	13.00	4.00	17.00	20.00
3	0	16	0	0	0	208	1	.33	17.33	.00	17.33	1.08	18.42	.00
4	4	16	0	0	0	208	1	.08	18.50	.00	18.50	1.00	19.50	.00
5	0	16	0	0	0	208	1	.08	19.58	.00	19.58	.48	20.06	.00
6	2	6	2	2	6	252	1	.33	20.39	.00	20.39	.17	20.56	20.00
7	0	16	0	0	0	208	1	.33	20.90	.00	20.90	.00	.00	.00

PATTERN 60 OBJECTIVES

TRAVEL TIME	.8200E+00	.3300E+00	.0000E+00	.0000E+00	.4100E+00
WAIT TIME	.9200E+00				
TIME AT HOME	.4200E+00	.7500E+00	.1317E+02		
POTENTIAL	.5460E+00	.1043E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

*** PATTERN 68 CLOSEST TO OBSERVED ***

HOUSEHOLD		86 INDIVIDUAL						1		RAP		7 FEASIBLE PATTERN				68	
ACTIVITY		TRAVEL						TEMPORAL SPECIFICATIONS				TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	FROM	TO		
1	1	1	0	1	0	252	1	.33	9.00	.00	9.00	3.00	12.00	12.00	20.00		
2	0	16	0	0	0	208	1	.33	12.33	.00	12.33	.33	12.67	12.67	.00		
3	3	1	0	0	0	252	1	.33	13.00	.00	13.00	4.00	17.00	17.00	20.00		
4	0	16	0	0	0	208	1	.33	17.33	.00	17.33	1.08	18.42	18.42	.00		
5	4	16	0	0	0	208	1	.08	18.50	.00	18.50	1.00	19.50	19.50	.00		
6	0	16	0	0	0	208	1	.08	19.58	.00	19.58	.48	20.06	20.06	.00		
7	2	6	2	2	6	252	1	.33	20.39	.00	20.39	.17	20.56	20.56	20.00		
8	0	16	0	0	0	208	1	.33	20.90	.00	20.90	.00	20.90	20.90	.00		

PATTERN 68 OBJECTIVES

TRAVEL TIME	.1070E+01	.3300E+00	.0000E+00	.0000E+00	.7400E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.7600E+00	.7500E+00	.1317E+02		
POTENTIAL	.5460E+00	.1043E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

 * HOUSEHOLD 87 *

 * INDIVIDUAL 1 *
 * PLANNED ACTIVITIES 3 *
 * HOME LOCATION 275 *
 * TRAVEL DAY START 7.00 *
 * TRAVEL DAY END 24.00 *

** OBJECTIVES WILL BE COMPUTED FOR 7 REPRESENTATIVE PATTERNS
 (BASED ON 18 FEASIBLE PATTERNS)

HOUSEHOLD		87 INDIVIDUAL						1		RAP		1 FEASIBLE PATTERN				1	
ACTIVITY		TRAVEL						TEMPORAL SPECIFICATIONS				TIME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	FROM	TO		
1	1	1	1	1	8	255	1	.17	8.00	.00	8.00	8.50	16.50	16.50	10.00		
2	2	6	1	2	5	255	1	.08	16.58	.00	16.58	.50	17.08	17.08	10.00		
3	3	16	0	0	0	275	1	.17	17.25	.75	18.00	1.00	19.00	19.00	.00		

PATTERN 1 OBJECTIVES

TRAVEL TIME	.4200E+00	.0000E+00	.0000E+00	.0000E+00	.0000E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.0000E+00	.0000E+00	.1458E+02		
POTENTIAL	.7140E+00	.2073E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS					TIME
		IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME
1	1	1	1	1	1	8	255	1	.17	8.00	.00	8.00	8.50	16.50	10.00
2	0	16	0	0	0	275	1	1	.17	16.67	.00	16.67	.25	16.92	.00
3	2	6	1	2	5	255	1	1	.17	17.08	.00	17.08	.50	17.58	10.00
4	3	16	0	0	0	275	1	1	.17	17.75	.25	18.00	1.00	19.00	.00

PATTERN 4 OBJECTIVES

TRAVEL TIME	.5100E+00	.0000E+00	.0000E+00	.0000E+00	.1700E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.0000E+00	.0000E+00	.1432E+02		
POTENTIAL	.7140E+00	.2073E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS					TIME
		IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME
1	1	1	1	1	1	8	255	1	.17	8.00	.00	8.00	8.50	16.50	10.00
2	2	6	1	2	5	255	1	1	.08	16.58	.00	16.58	.50	17.08	10.00
3	0	16	0	0	0	275	1	1	.17	17.25	.00	17.25	.67	17.92	.00
4	3	16	0	0	0	275	1	1	.08	18.00	.00	18.00	1.00	19.00	.00

PATTERN 6 OBJECTIVES

TRAVEL TIME	.3300E+00	.0000E+00	.0000E+00	.0000E+00	.1700E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.0000E+00	.0000E+00	.1450E+02		
POTENTIAL	.7140E+00	.2073E+00			
PATTERN RISK	.1000E+01	.0000E+00	.0000E+00	.0000E+00	

		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS					TIME
		IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME
1	1	1	1	1	1	8	255	1	.17	8.00	.00	8.00	8.50	16.50	10.00
2	3	16	0	0	0	275	1	1	.17	16.67	1.33	18.00	1.00	19.00	.00
3	0	16	0	0	0	275	1	1	.08	19.08	.00	19.08	.00	19.08	.00
4	2	6	1	2	5	255	1	1	.17	19.25	.00	19.25	.50	19.75	10.00
5	0	16	0	0	0	275	1	1	.17	19.92	.00	19.92	.00	.00	.00

PATTERN 8 OBJECTIVES

TRAVEL TIME	.6800E+00	.0000E+00	.0000E+00	.0000E+00	.8000E-01
WAIT TIME	.0000E+00				
TIME AT HOME	-.3500E+01	-.1992E+02	.1016E+02		
POTENTIAL	.9744E+00	.2727E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

ACTIVITY								TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME		
1	1	1	1	1	8 255	1	.17	8.00	.00	8.00	8.50	16.50	10.00		
2	3	16	0	0	0 275	1	.17	16.67	1.33	18.00	1.00	19.00	.00		
3	0	16	0	0	0 275	1	.08	19.08	.00	19.08	1.68	20.77	.00		
4	2	6	1	2	5 255	1	.17	20.93	.00	20.93	.50	21.43	10.00		
5	0	16	0	0	0 275	1	.17	21.60	.00	21.60	.00	.00	.00		

PATTERN 11 OBJECTIVES

TRAVEL TIME	.6800E+00	.0000E+00	.0000E+00	.0000E+00	.8000E-01
WAIT TIME	.0000E+00				
TIME AT HOME	.0000E+00	.0000E+00	.1424E+02		
POTENTIAL	.8316E+00	.2341E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

*** PATTERN 13 CLOSEST TO OBSERVED ***

HOUSEHOLD 87 INDIVIDUAL 1 RAP 6 FEASIBLE PATTERN 13

ACTIVITY								TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME		
1	1	1	1	1	8 255	1	.17	8.00	.00	8.00	8.50	16.50	10.00		
2	0	16	0	0	0 275	1	.17	16.67	.00	16.67	.00	16.67	.00		
3	2	6	1	2	5 255	1	.17	16.83	.00	16.83	.50	17.33	10.00		
4	0	16	0	0	0 275	1	.17	17.50	.00	17.50	.42	17.92	.00		
5	3	16	0	0	0 275	1	.08	18.00	.00	18.00	1.00	19.00	.00		

PATTERN 13 OBJECTIVES

TRAVEL TIME	.4200E+00	.0000E+00	.0000E+00	.0000E+00	.3400E+00
WAIT TIME	.0000E+00				
TIME AT HOME	-.1760E+01	-.1750E+02	-.1017E+02		
POTENTIAL	.7140E+00	.2073E+00			
PATTERN RISK	.1000E+01	.0000E+00	.0000E+00	.0000E+00	

HOUSEHOLD 87 INDIVIDUAL 1 RAP 7 FEASIBLE PATTERN 16

ACTIVITY								TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME		
1	1	1	1	1	8 255	1	.17	8.00	.00	8.00	8.50	16.50	10.00		
2	0	16	0	0	0 275	1	.17	16.67	.00	16.67	1.25	17.92	.00		
3	3	16	0	0	0 275	1	.08	18.00	.00	18.00	1.00	19.00	.00		
4	0	16	0	0	0 275	1	.08	19.08	.00	19.08	1.12	20.21	.00		
5	2	6	1	2	5 255	1	.17	20.37	.00	20.37	.50	20.87	10.00		
6	0	16	0	0	0 275	1	.17	21.04	.00	21.04	.00	.00	.00		

PATTERN 16 OBJECTIVES

TRAVEL TIME	.5900E+00	.0000E+00	.0000E+00	.0000E+00	.2500E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.0000E+00	.0000E+00	.1416E+02		

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*****
* HOUSEHOLD      92      *
*****
* INDIVIDUAL    1      *
*   PLANNED ACTIVITIES      3      *
*   HOME LOCATION      269      *
*   TRAVEL DAY START      6.00      *
*   TRAVEL DAY END      24.00      *
*****
    
```

** OBJECTIVES WILL BE COMPUTED FOR 6 REPRESENTATIVE PATTERNS
(BASED ON 14 FEASIBLE PATTERNS)

HOUSEHOLD		92		INDIVIDUAL		1		RAP		1		FEASIBLE PATTERN		2	
ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS		TIME		FROM		HOME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME		
1	1	1	2	1	8	252	1	.25	8.00	.00	8.00	8.50	16.50	15.00	
2	3	16	0	0	0	269	1	.25	16.75	1.25	18.00	1.00	19.00	.00	
3	2	6	1	2	6	256	1	.25	19.25	.00	19.25	.84	20.09	15.00	
4	0	16	0	0	0	269	1	.25	20.34	.00	20.34	.00	.00	.00	

PATTERN 2 OBJECTIVES

TRAVEL TIME	.7500E+00	.2500E+00	.0000E+00	.0000E+00	.0000E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1500E+01	.3240E+01	.8920E+01		
POTENTIAL	.7318E+00	.1759E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

HOUSEHOLD		92		INDIVIDUAL		1		RAP		2		FEASIBLE PATTERN		3	
ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS		TIME		FROM		HOME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME		
1	1	1	2	1	8	252	1	.25	8.00	.00	8.00	8.50	16.50	15.00	
2	2	6	1	2	6	256	1	.17	16.67	.00	16.67	.84	17.51	15.00	
3	0	16	0	0	0	269	1	.25	17.76	.00	17.76	.16	17.92	.00	
4	3	16	0	0	0	269	1	.08	18.00	.00	18.00	1.00	19.00	.00	

PATTERN 3 OBJECTIVES

TRAVEL TIME	.2500E+00	.2500E+00	.0000E+00	.0000E+00	.2500E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1500E+01	.4580E+01	.7830E+01		
POTENTIAL	.7140E+00	.2073E+00			
PATTERN RISK	.1000E+01	.0000E+00	.0000E+00	.0000E+00	

HOUSEHOLD		92		INDIVIDUAL		1		RAP		3		FEASIBLE PATTERN		5	
ACTIVITY		TRAVEL		TEMPORAL SPECIFICATIONS		TIME		FROM		HOME					
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME		

1	1	1	2	1	8	252	1	.25	8.00	.00	8.00	8.50	16.50	15.00
2	3	16	0	0	0	269	1	.25	16.75	1.25	18.00	1.00	19.00	.00
3	0	16	0	0	0	269	1	.08	19.08	.00	19.08	.00	19.08	.00
4	2	6	1	2	6	256	1	.25	19.33	.00	19.33	.84	20.17	15.00
5	0	16	0	0	0	269	1	.25	20.42	.00	20.42	.00	.00	.00

PATTERN 5 OBJECTIVES

TRAVEL TIME	.7500E+00	.2500E+00	.0000E+00	.0000E+00	.8000E-01
WAIT TIME	.0000E+00				
TIME AT HOME	.1500E+01	.3160E+01	.8920E+01		
POTENTIAL	.6141E+00	.1523E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

HOUSEHOLD 92 INDIVIDUAL 1 RAP 4 FEASIBLE PATTERN 8

ACTIVITY							TRAVEL		TEMPORAL SPECIFICATIONS				TIME	
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	2	1	8	252	1	.25	8.00	.00	8.00	8.50	16.50	15.00
2	3	16	0	0	0	269	1	.25	16.75	1.25	18.00	1.00	19.00	.00
3	0	16	0	0	0	269	1	.08	19.08	.00	19.08	1.37	20.45	.00
4	2	6	1	2	6	256	1	.25	20.70	.00	20.70	.84	21.54	15.00
5	0	16	0	0	0	269	1	.25	21.79	.00	21.79	.00	.00	.00

PATTERN 8 OBJECTIVES

TRAVEL TIME	.7500E+00	.2500E+00	.0000E+00	.0000E+00	.8000E-01
WAIT TIME	.0000E+00				
TIME AT HOME	.1500E+01	.3160E+01	.8920E+01		
POTENTIAL	.8316E+00	.2341E+00			
PATTERN RISK	.1000E+01	.1000E+01	.0000E+00	.0000E+00	

*** PATTERN 10 CLOSEST TO OBSERVED ***

HOUSEHOLD 92 INDIVIDUAL 1 RAP 5 FEASIBLE PATTERN 10

ACTIVITY							TRAVEL		TEMPORAL SPECIFICATIONS				TIME	
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME	
1	1	1	2	1	8	252	1	.25	8.00	.00	8.00	8.50	16.50	15.00
2	0	16	0	0	0	269	1	.25	16.75	.00	16.75	1.17	17.92	.00
3	3	16	0	0	0	269	1	.08	18.00	.00	18.00	1.00	19.00	.00
4	0	16	0	0	0	269	1	.08	19.08	.00	19.08	.00	19.08	.00
5	2	6	1	2	6	256	1	.25	19.33	.00	19.33	.84	20.17	15.00
6	0	16	0	0	0	269	1	.25	20.42	.00	20.42	.00	.00	.00

PATTERN 10 OBJECTIVES

TRAVEL TIME	.5800E+00	.2500E+00	.0000E+00	.0000E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1500E+01	.3160E+01	.8840E+01		
POTENTIAL	.6141E+00	.1523E+00			
PATTERN RISK	.1000E+01	.0000E+00	.0000E+00	.0000E+00	

		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS					TIME
		-----						-----		-----					FROM
		INO	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME
1	1	1	2	1	8	252	1	1	.25	8.00	.00	8.00	8.50	16.50	15.00
2	0	16	0	0	0	269	1	1	.25	16.75	.00	16.75	1.17	17.92	.00
3	3	16	0	0	0	269	1	1	.08	18.00	.00	18.00	1.00	19.00	.00
4	0	16	0	0	0	269	1	1	.08	19.08	.00	19.08	1.37	20.45	.00
5	2	6	1	2	6	256	1	1	.25	20.70	.00	20.70	.84	21.54	15.00
6	0	16	0	0	0	269	1	1	.25	21.79	.00	21.79	.00	.00	.00

PATTERN 13 OBJECTIVES

TRAVEL TIME	.5800E+00	.2500E+00	.0000E+00	.0000E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1500E+01	.3160E+01	.8840E+01		
POTENTIAL	.8316E+00	.2341E+00			
PATTERN RISK	.1000E+01	.0000E+00	.0000E+00	.0000E+00	

* HOUSEHOLD 92 *

* INDIVIDUAL 3 *
* PLANNED ACTIVITIES 2 *
* HOME LOCATION 269 *
* TRAVEL DAY START 6.00 *
* TRAVEL DAY END 24.00 *

** OBJECTIVES WILL BE COMPUTED FOR 5 REPRESENTATIVE PATTERNS (BASED ON 6 FEASIBLE PATTERNS)

HOUSEHOLD 92 INDIVIDUAL 3 RAP 1 FEASIBLE PATTERN 1

		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS					TIME
		-----						-----		-----					FROM
		INO	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME
1	1	1	1	1	8	114	1	1	.33	6.50	.00	6.50	9.50	16.00	20.00
2	2	5	0	2	6	1	1	1	.42	16.42	.00	16.42	3.67	20.09	20.00
3	0	16	0	0	0	269	1	1	.33	20.42	.00	20.42	.00	.00	.00

PATTERN 1 OBJECTIVES

TRAVEL TIME	.6600E+00	.0000E+00	.0000E+00	.4200E+00	.0000E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.0000E+00	.0000E+00	.9750E+01		
POTENTIAL	.2192E+00	.4652E-01			
PATTERN RISK	.0000E+00	.0000E+00	.0000E+00	.1000E+01	

HOUSEHOLD 92 INDIVIDUAL 3 RAP 2 FEASIBLE PATTERN 2

		ACTIVITY						TRAVEL		TEMPORAL SPECIFICATIONS					TIME
		-----						-----		-----					FROM
		INO	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME

1	2	1	0	16	0	0	0	269	1	1	.33	16.33	.00	16.33	.00	16.33	.001	.001
1	3	1	2	5	0	2	6	1	1	1	.33	16.67	.00	16.67	3.67	20.34	20.00	.001
1	4	1	0	16	0	0	0	269	1	1	.33	20.67	.00	20.67	.00	.001	.001	.001

PATTERN 2 OBJECTIVES

TRAVEL TIME	.6600E+00	.0000E+00	.0000E+00	.3300E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.9995E-02	.0000E+00	.9500E+01		
POTENTIAL	.1428E+00	.3967E-01			
PATTERN RISK	.0000E+00	.0000E+00	.0000E+00	.1000E+01	

*** PATTERN 3 CLOSEST TO OBSERVED ***

HOUSEHOLD 92 INDIVIDUAL 3 RAP 3 FEASIBLE PATTERN 3

ACTIVITY										TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME				
1	1	1	1	1	8	114	1	.33	6.50	.00	6.50	9.50	16.00	20.00			
1	2	1	0	16	0	0	269	1	.33	16.33	.00	16.33	.91	17.25	.001		
1	3	1	2	5	0	2	6	1	1	.33	17.58	.00	17.58	3.67	21.25	20.00	
1	4	1	0	16	0	0	269	1	1	.33	21.58	.00	21.58	.00	.001	.001	

PATTERN 3 OBJECTIVES

TRAVEL TIME	.6600E+00	.0000E+00	.0000E+00	.3300E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1700E+00	.7500E+00	.8590E+01		
POTENTIAL	.4213E+00	.3243E-01			
PATTERN RISK	.0000E+00	.0000E+00	.0000E+00	.1000E+01	

HOUSEHOLD 92 INDIVIDUAL 3 RAP 4 FEASIBLE PATTERN 4

ACTIVITY										TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME				
1	1	1	1	1	8	114	1	.33	6.50	.00	6.50	9.50	16.00	20.00			
1	2	1	0	16	0	0	269	1	.33	16.33	.00	16.33	1.83	18.16	.001		
1	3	1	2	5	0	2	6	1	1	.33	18.49	.00	18.49	3.67	22.16	20.00	
1	4	1	0	16	0	0	269	1	1	.33	22.50	.00	22.50	.00	.001	.001	

PATTERN 4 OBJECTIVES

TRAVEL TIME	.6600E+00	.0000E+00	.0000E+00	.3300E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1700E+00	.1250E+01	.8080E+01		
POTENTIAL	.7051E+00	.5561E-01			
PATTERN RISK	.0000E+00	.0000E+00	.0000E+00	.1000E+01	

HOUSEHOLD 92 INDIVIDUAL 3 RAP 5 FEASIBLE PATTERN 6

ACTIVITY										TRAVEL		TEMPORAL SPECIFICATIONS					TIME
IND	TP	IM	FR	KN	ZONE	MODE	TIME	ARRIVAL	IDLE	START	LENGTH	FINISH	HOME				

1	2	1	0	16	0	0	0	269	1	1	.33	16.33	.00	16.33	3.65	19.99	.00
1	3	1	2	5	0	2	6	1	1	1	.33	20.32	.00	20.32	3.67	23.99	20.00
1	4	1	0	16	0	0	0	269	1	1	.33	24.32	.00	24.32	.00	.00	.00

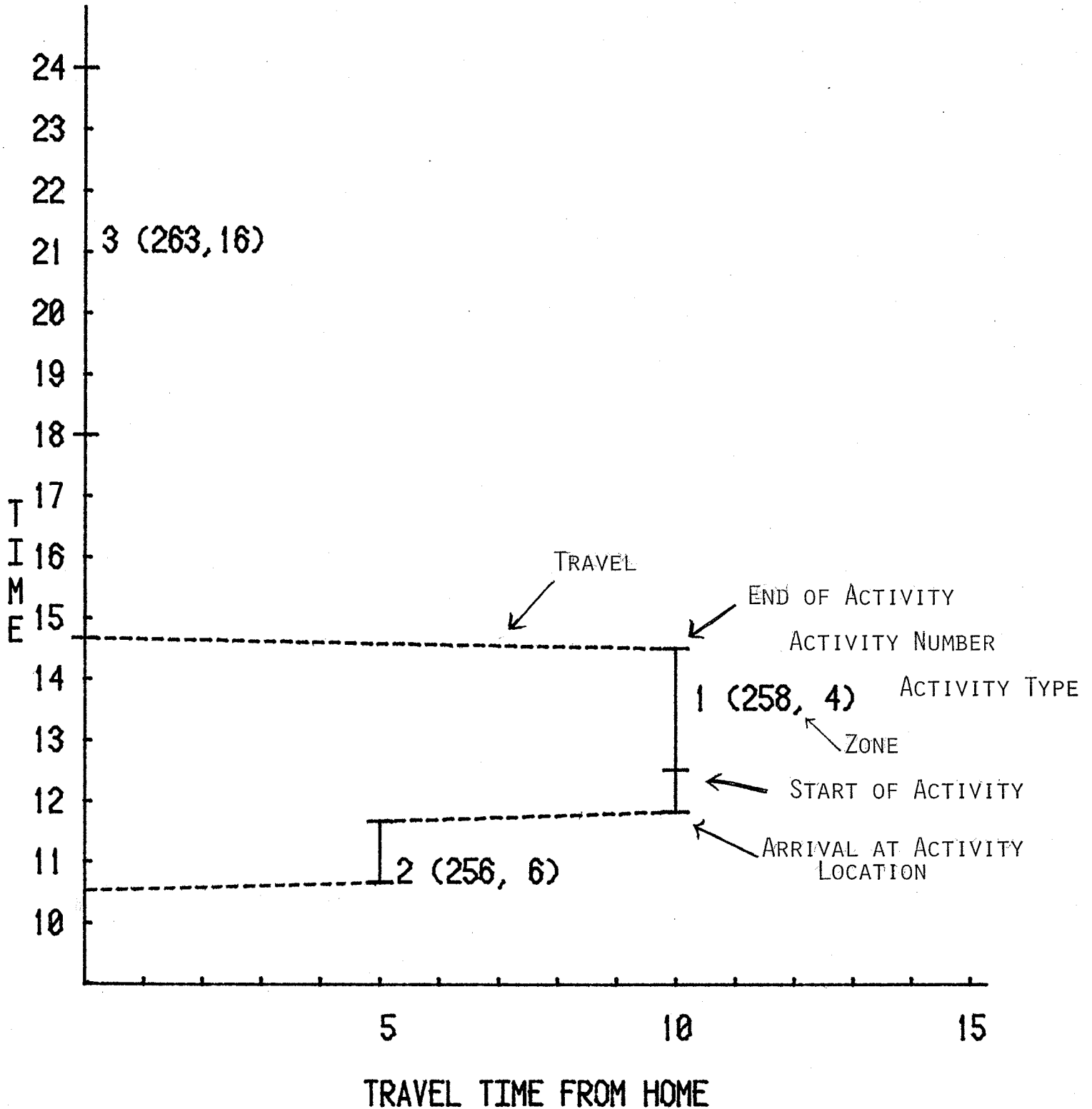
PATTERN 6 OBJECTIVES

TRAVEL TIME	.6600E+00	.0000E+00	.0000E+00	.3300E+00	.3300E+00
WAIT TIME	.0000E+00				
TIME AT HOME	.1700E+00	.1250E+01	.8410E+01		
POTENTIAL	.7140E+00	.5690E-01			
PATTERN RISK	.0000E+00	.0000E+00	.0000E+00	.1000E+01	

END OF ANALYSIS

STOP

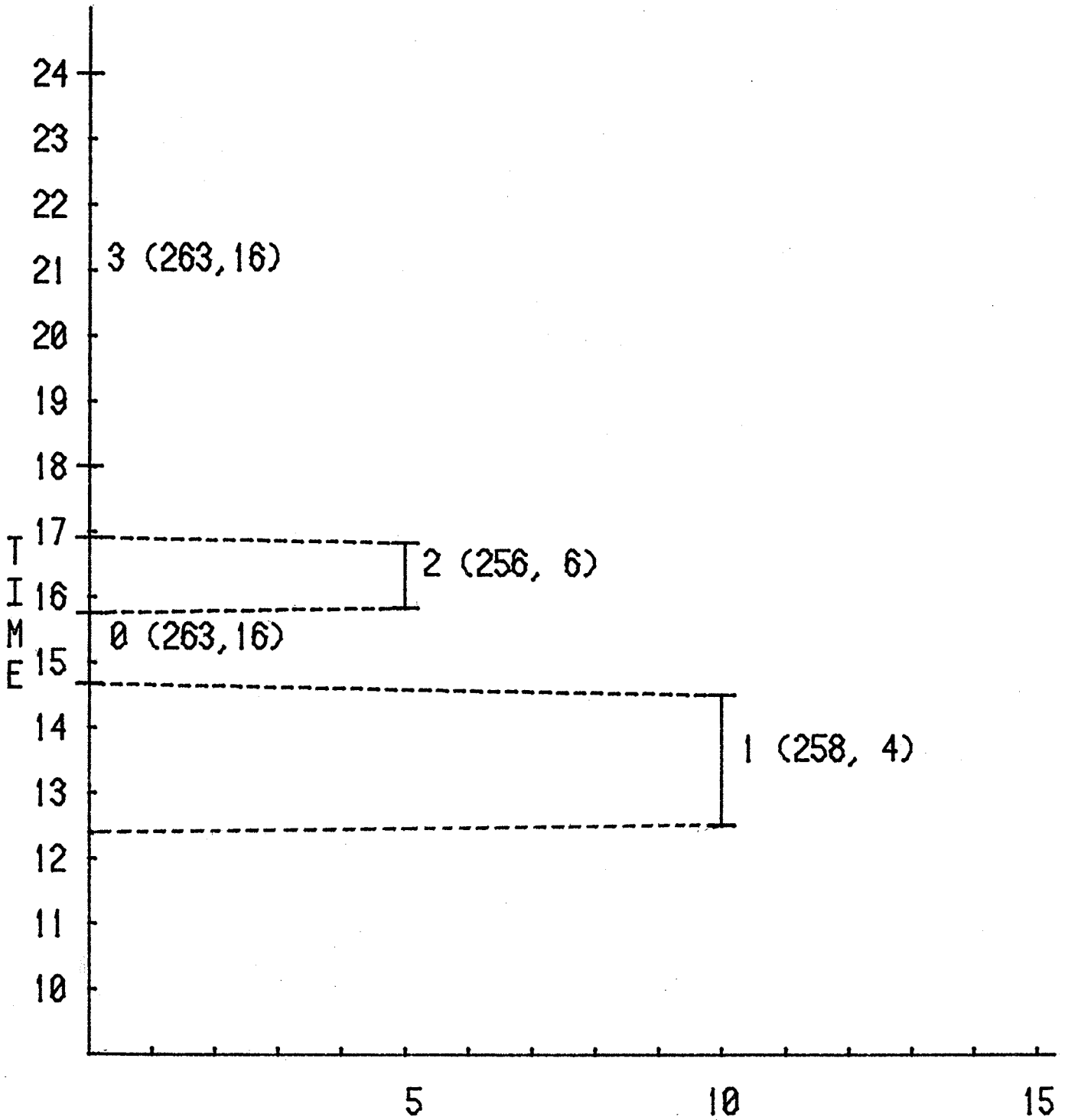
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HOUSEHOLD: 56

PERSON: 1

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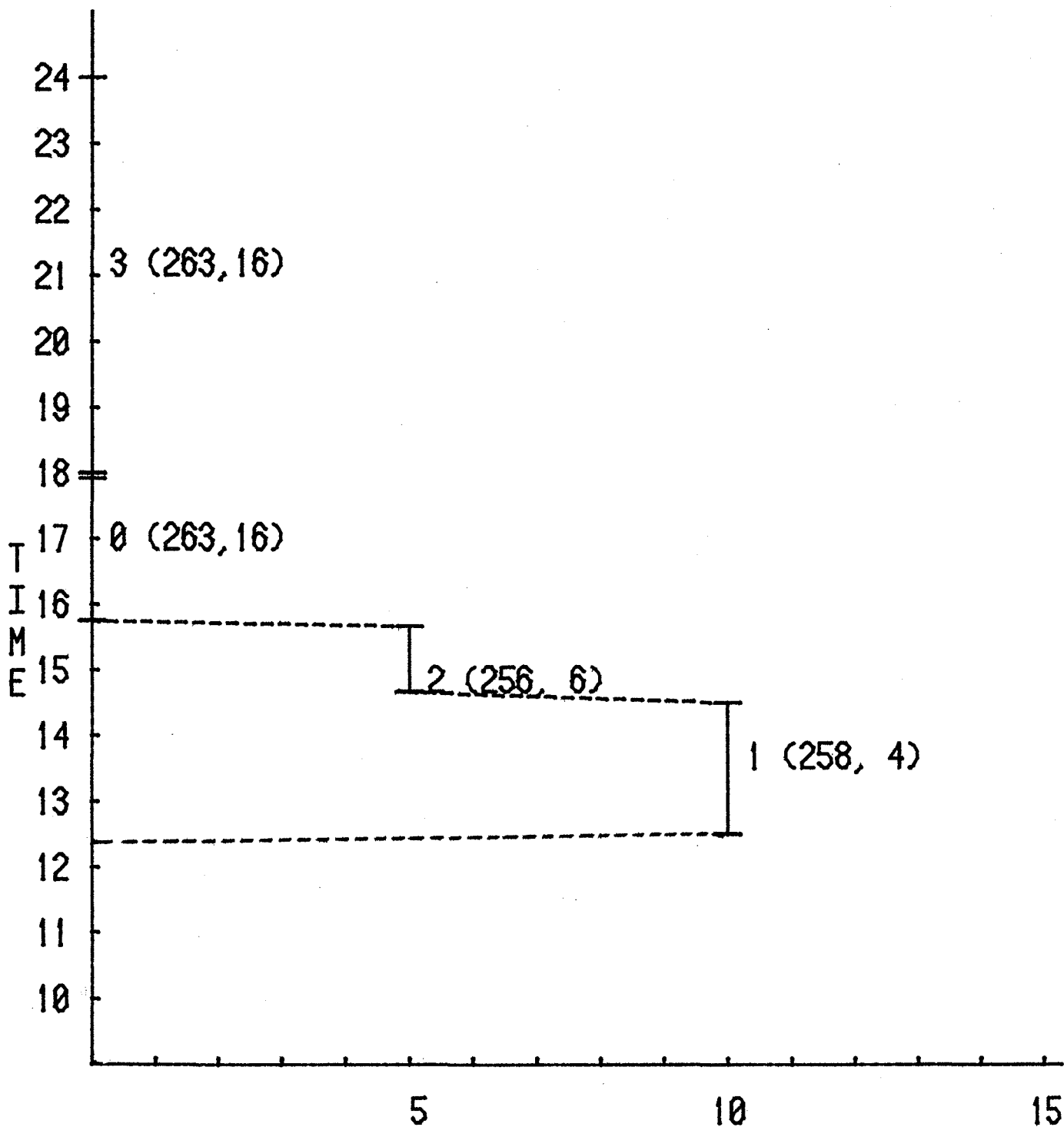


TRAVEL TIME FROM HOME

HOUSEHOLD: 56

PERSON: 1

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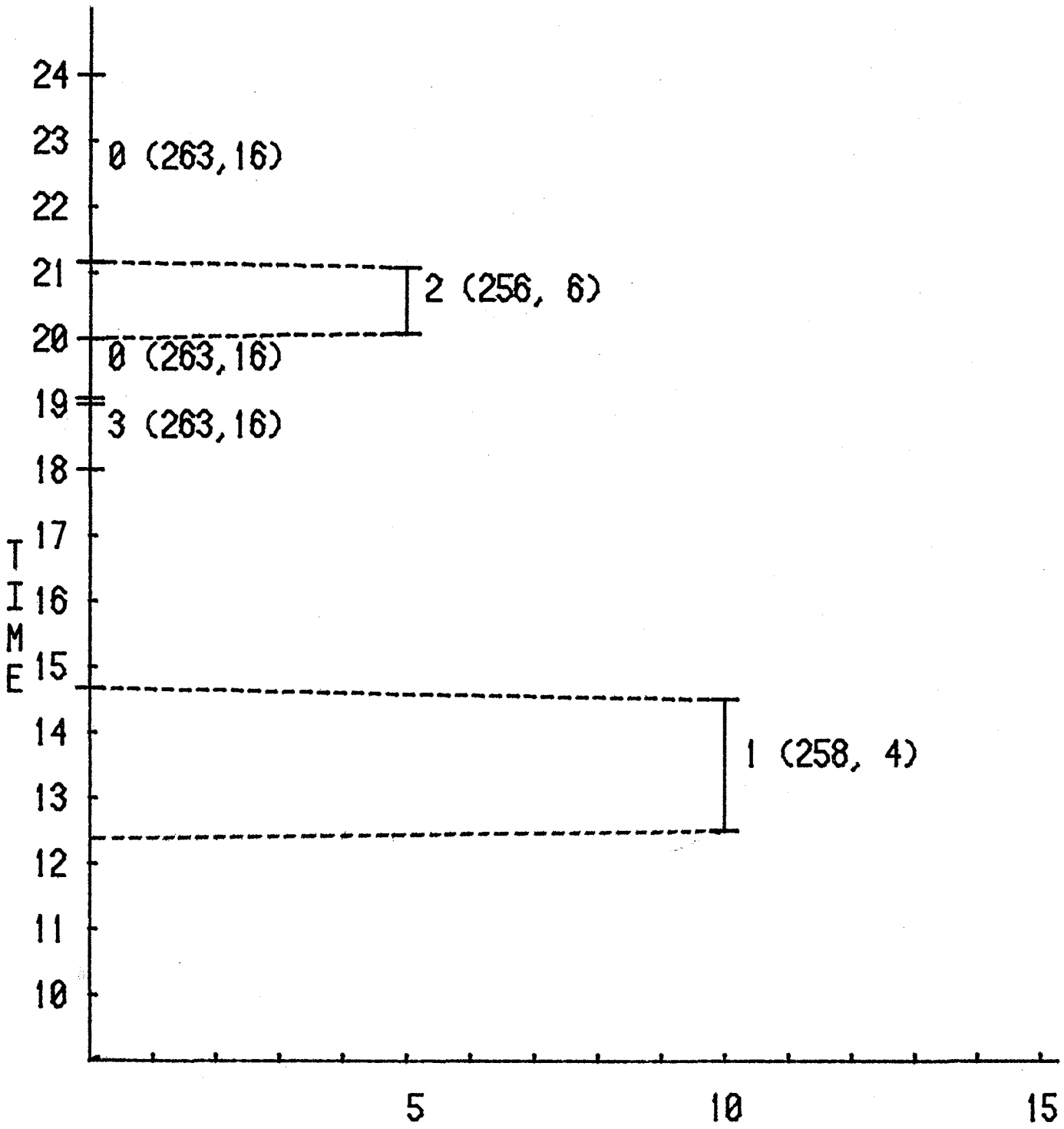


TRAVEL TIME FROM HOME

HOUSEHOLD: 56

PERSON: 1

13

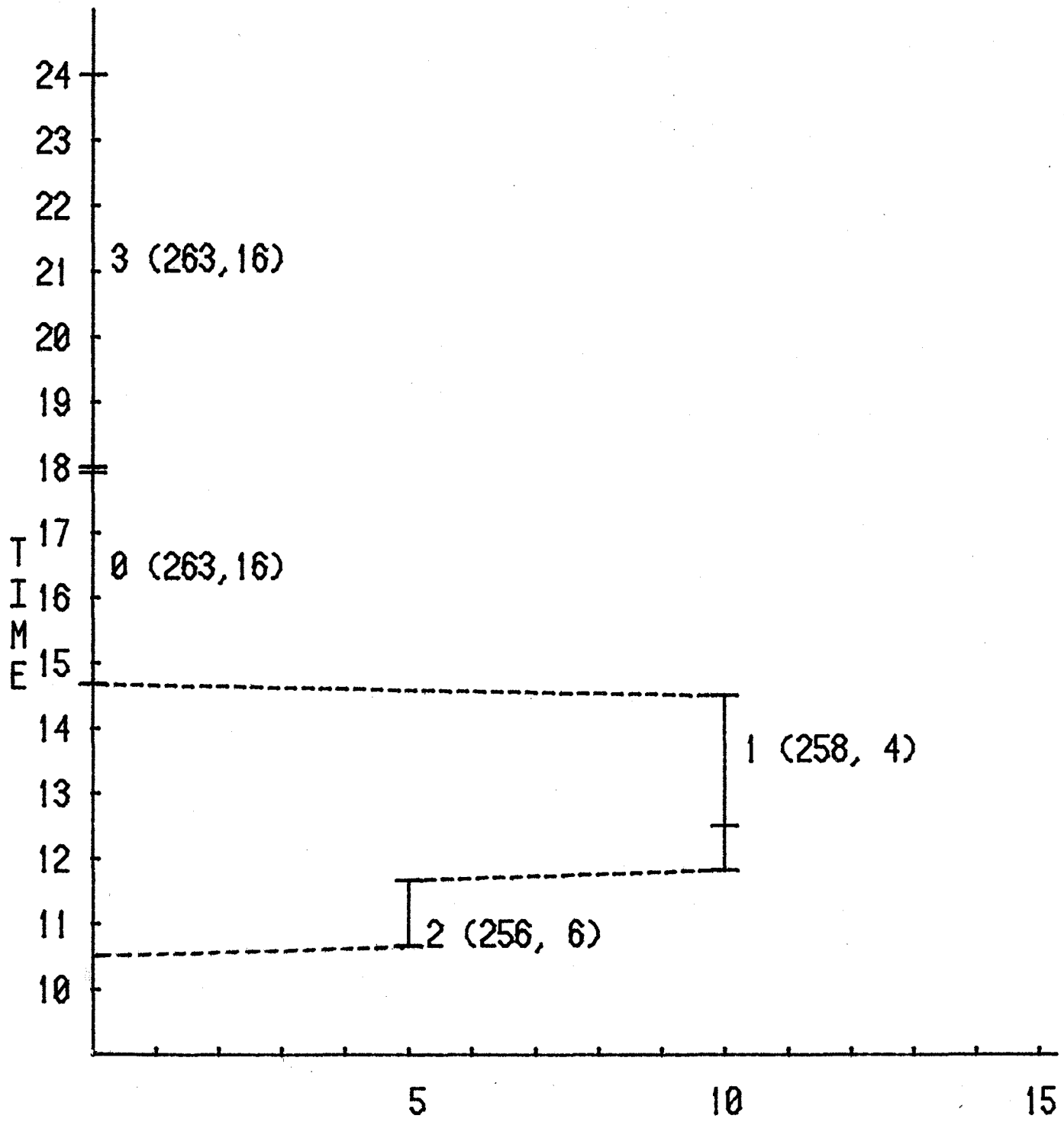


TRAVEL TIME FROM HOME

HOUSEHOLD: 56

PERSON: 1

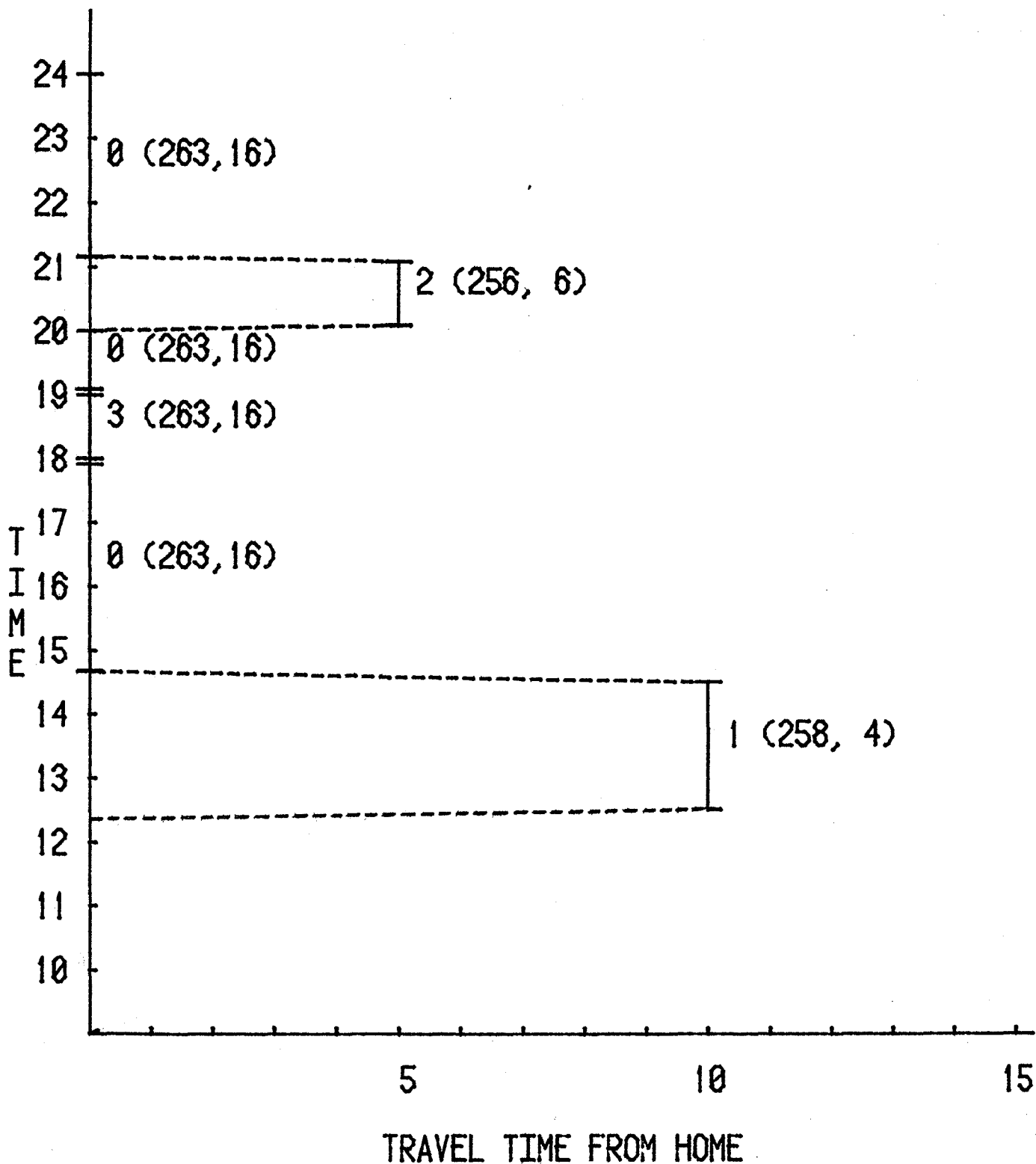
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HOUSEHOLD: 56

PERSON: 1

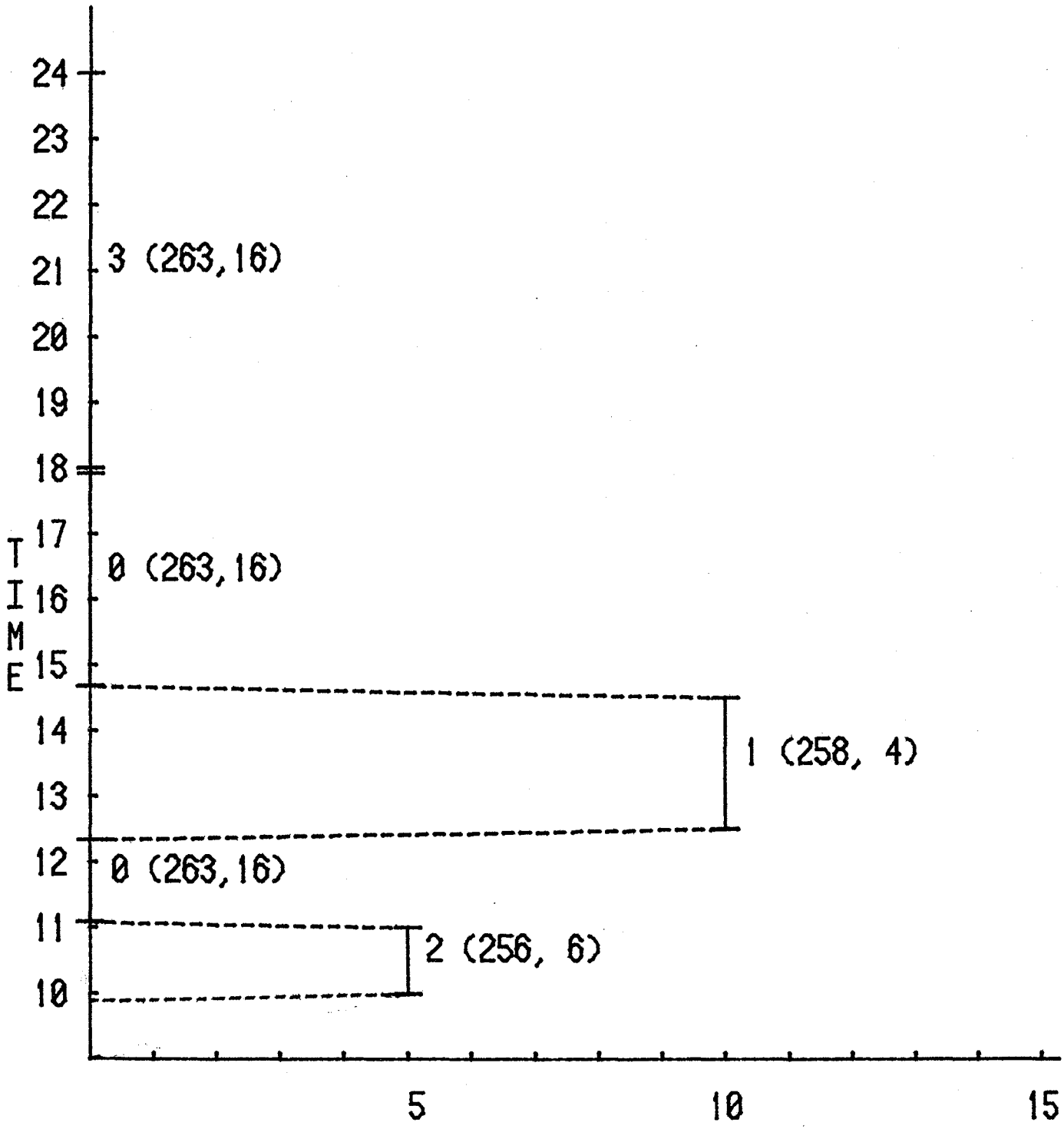
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HOUSEHOLD: 56

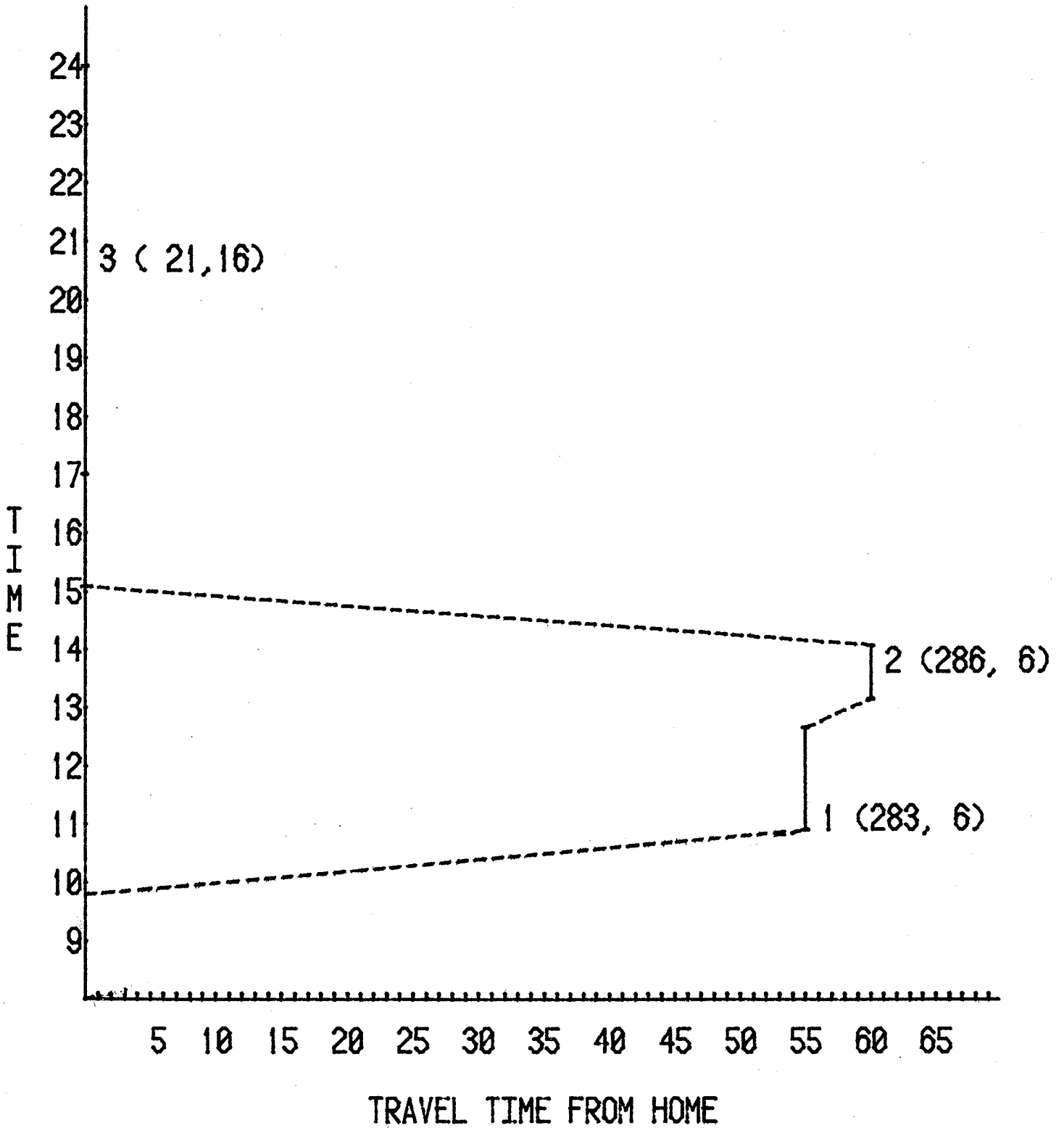
PERSON: 1

29



TRAVEL TIME FROM HOME

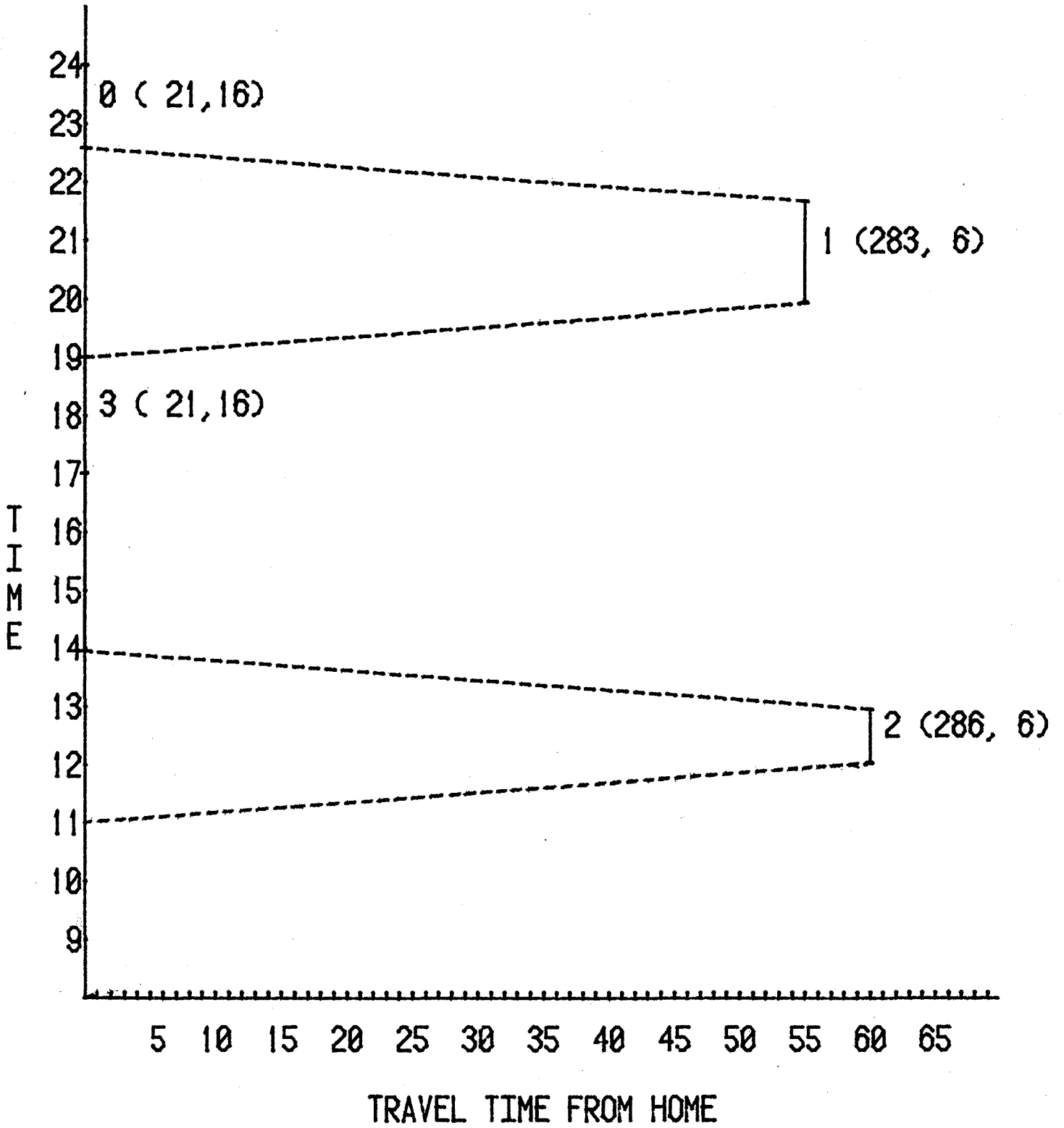
HOUSEHOLD: 56 PERSON: 1 CHOSEN 32



HOUSEHOLD: 67

PERSON: 1

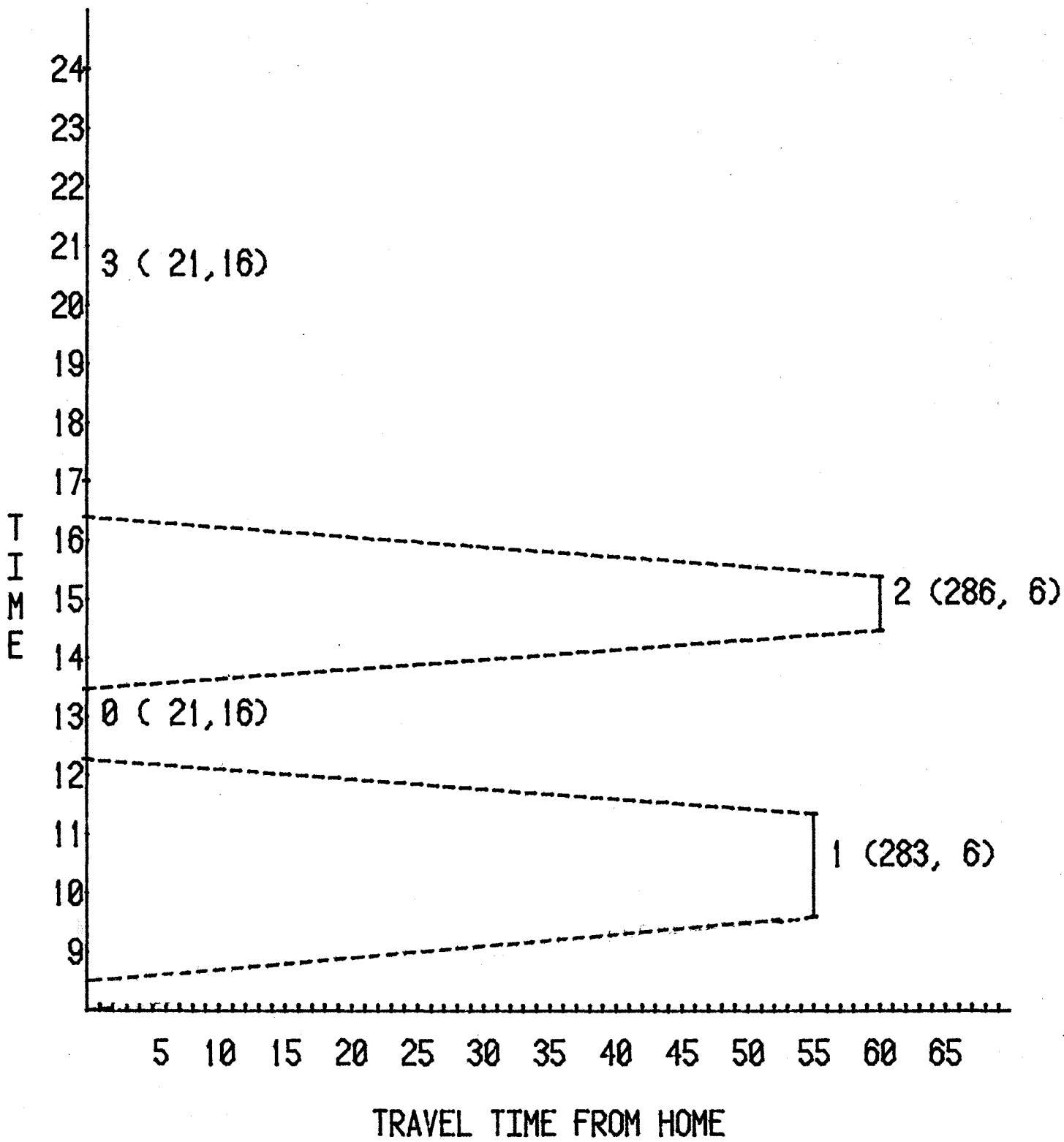
3



HOUSEHOLD: 67

PERSON: 1

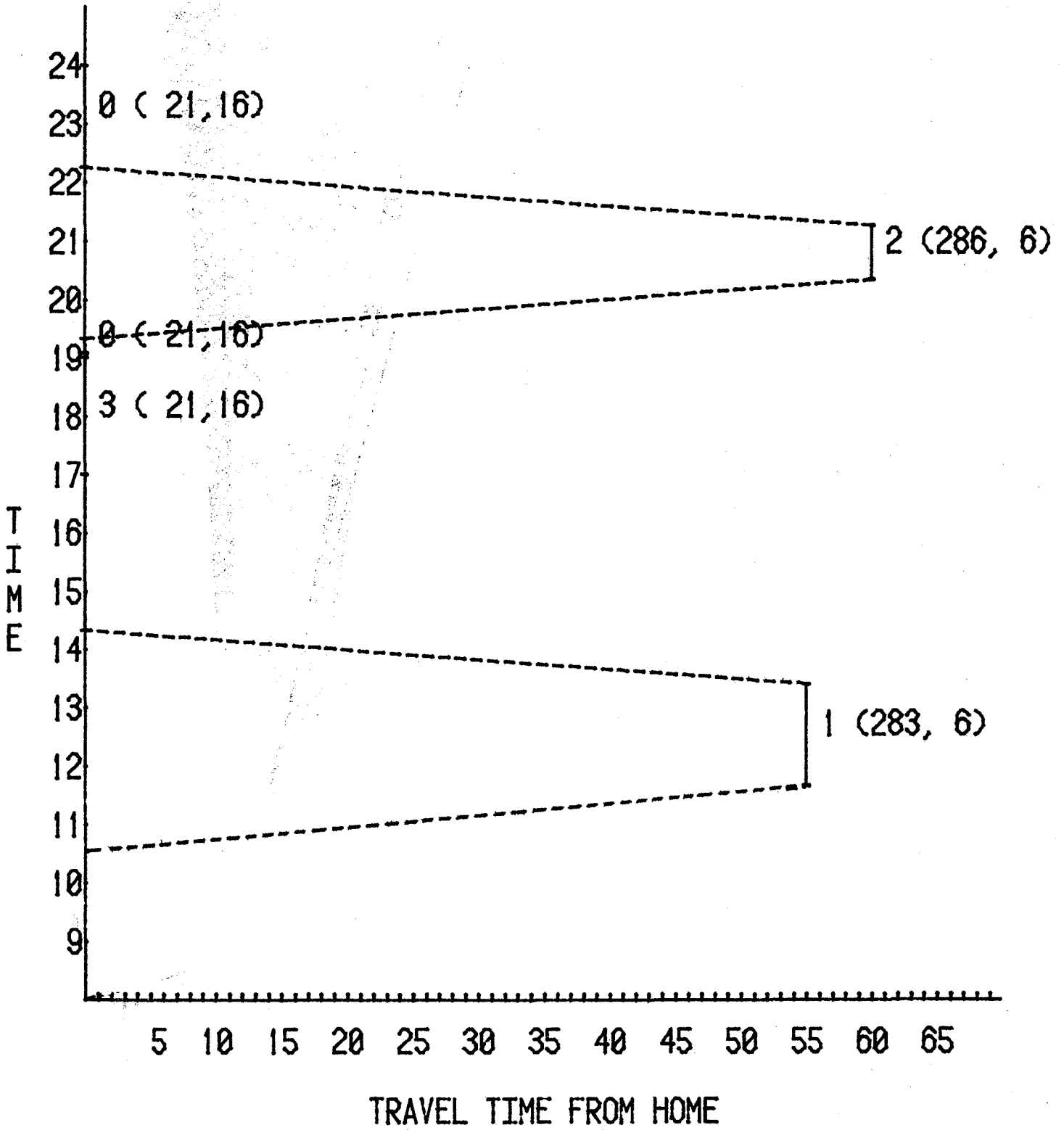
18



HOUSEHOLD: 67

PERSON: 1

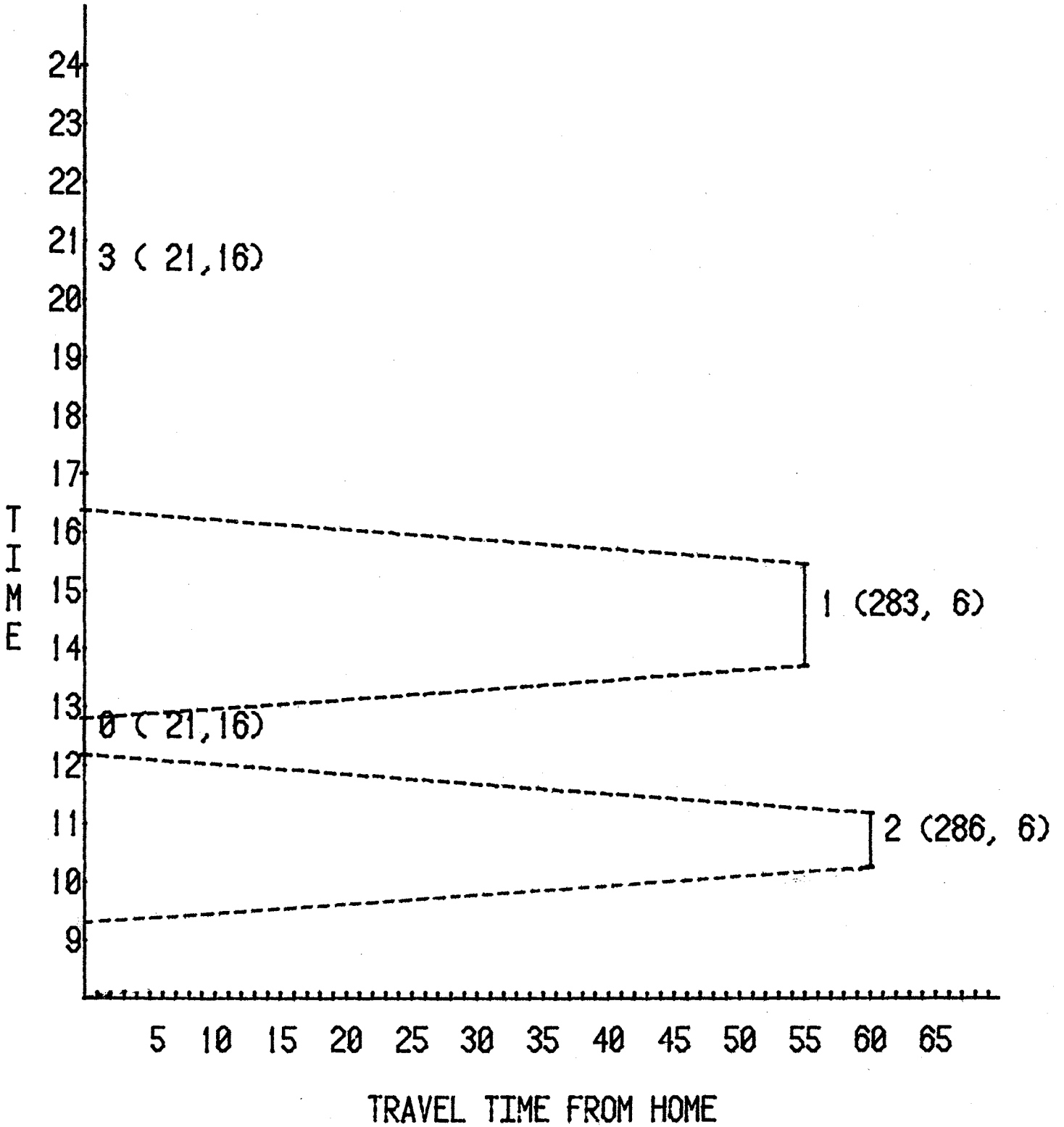
28



HOUSEHOLD: 67

PERSON: 1

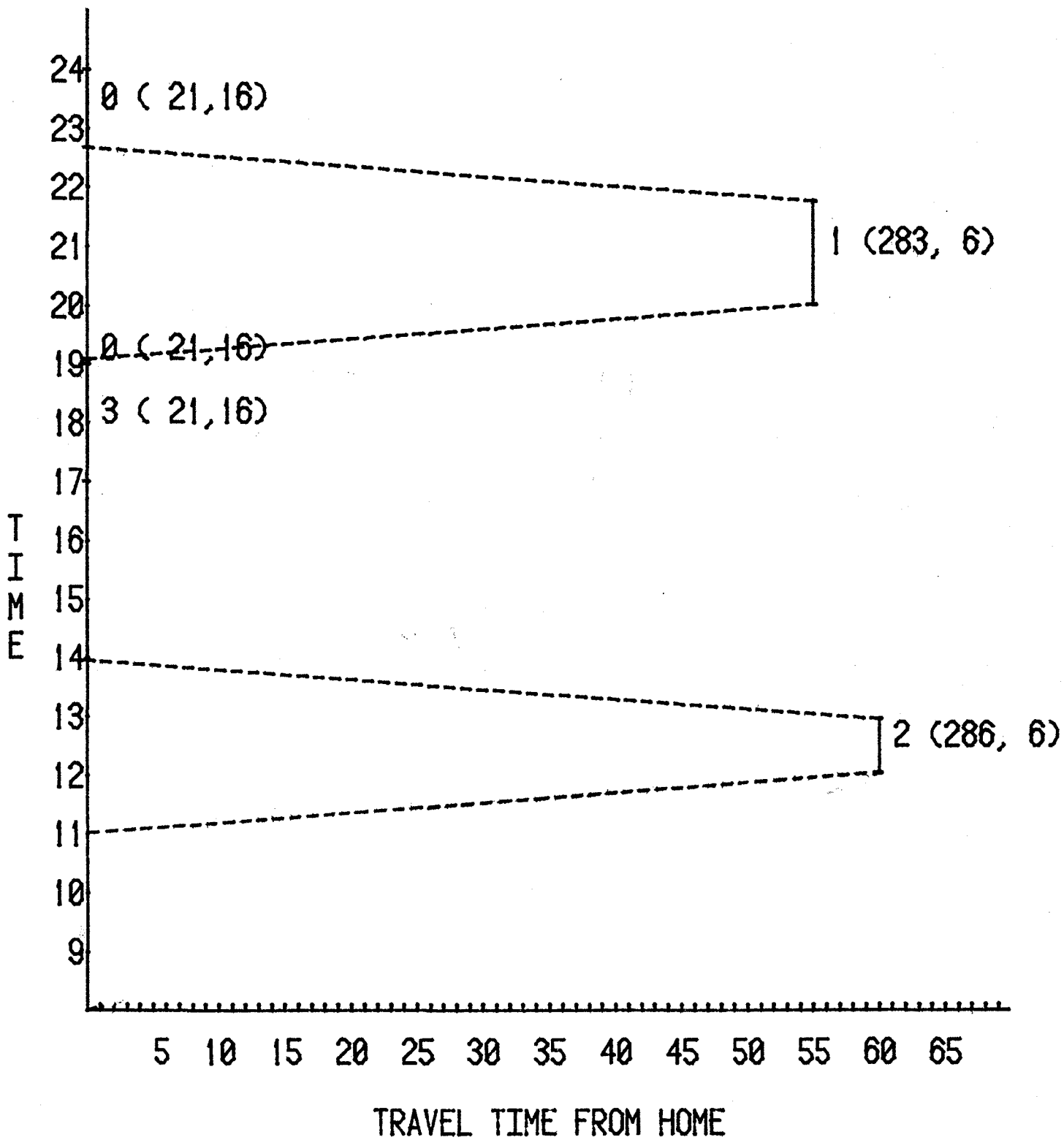
47



HOUSEHOLD: 67

PERSON: 1

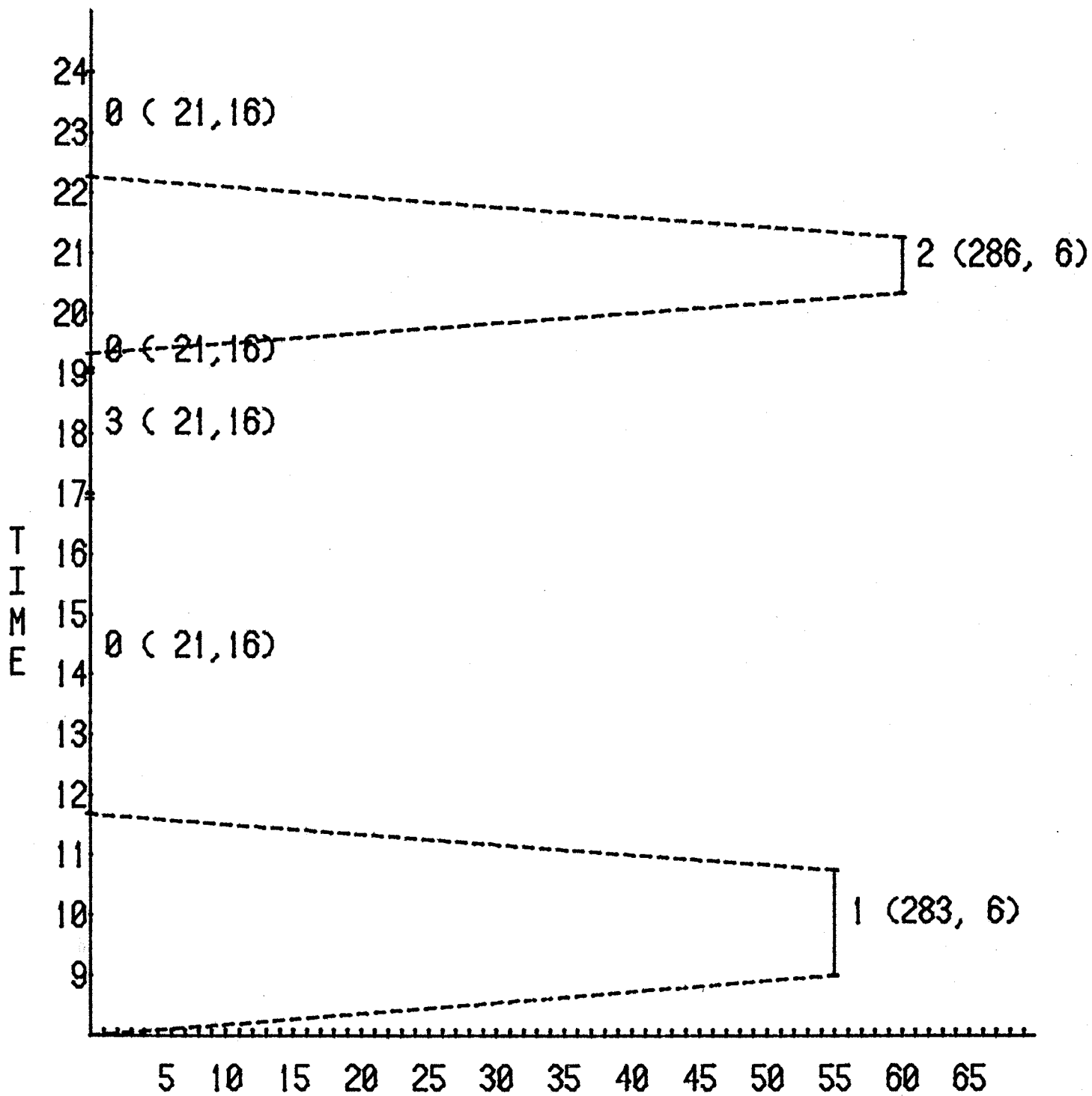
68



HOUSEHOLD: 67

PERSON: 1

79



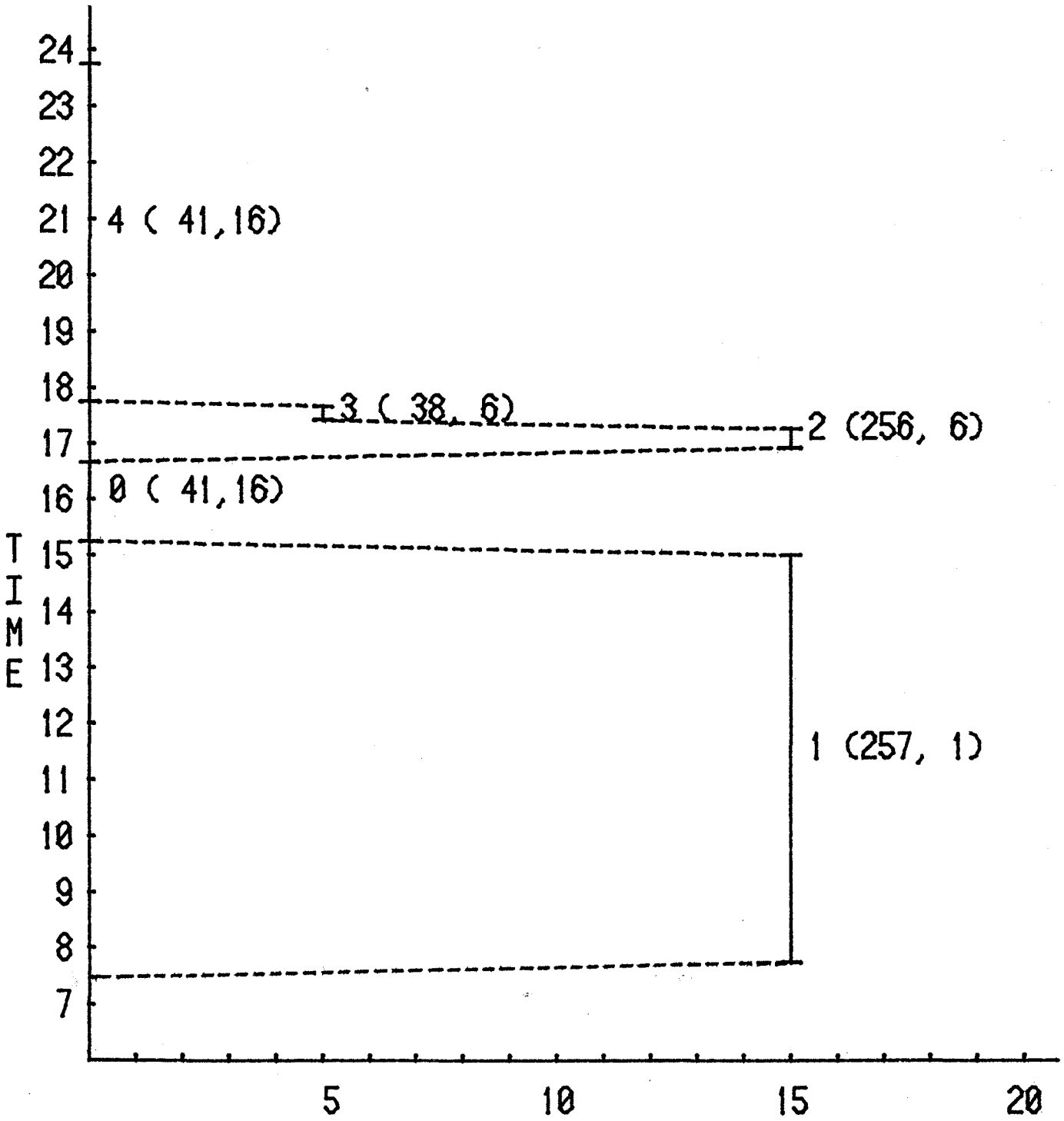
TRAVEL TIME FROM HOME

HOUSEHOLD: 67

PERSON: 1

CHOSEN

87

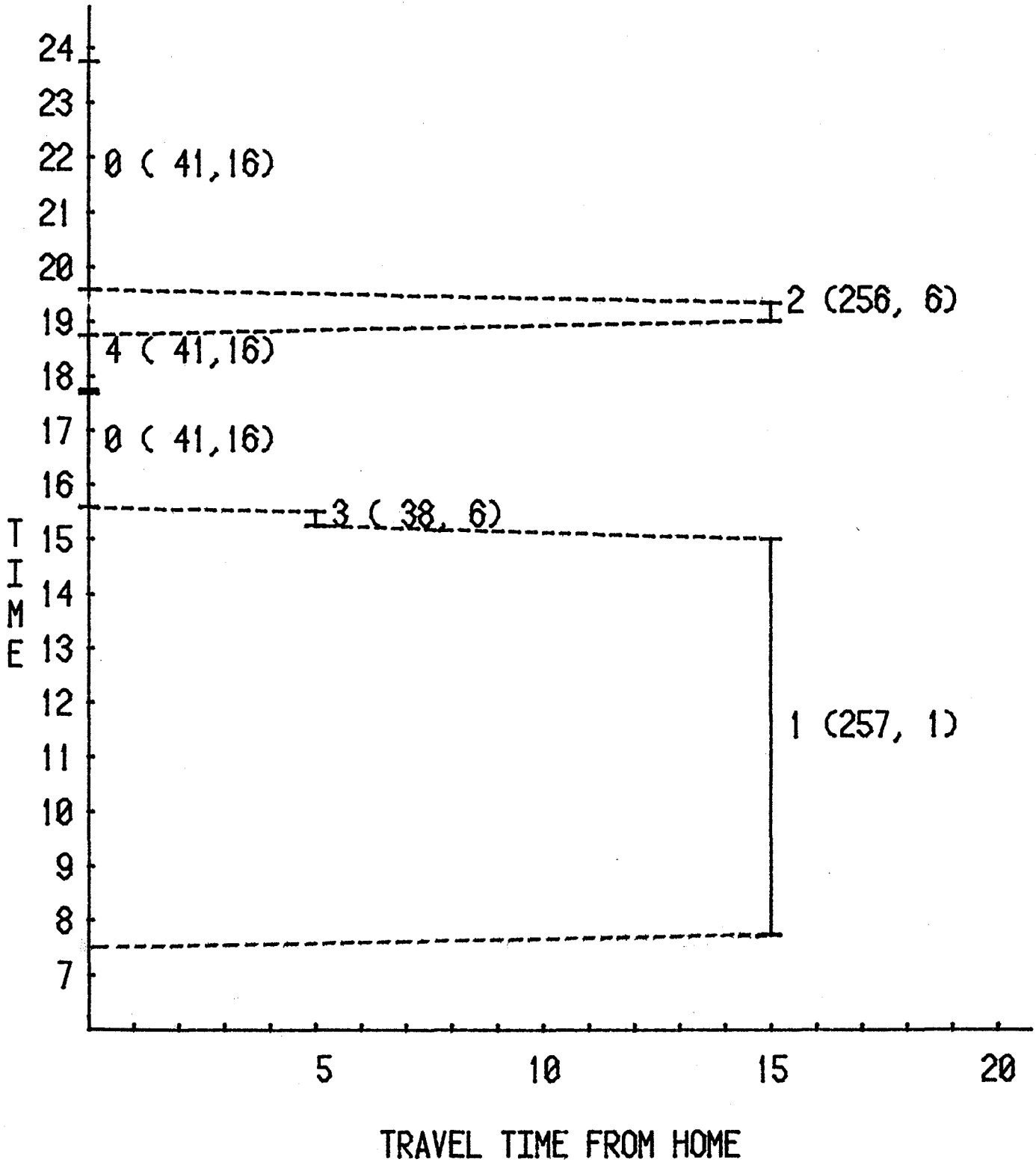


TRAVEL TIME FROM HOME

HOUSEHOLD: 74

PERSON: 1

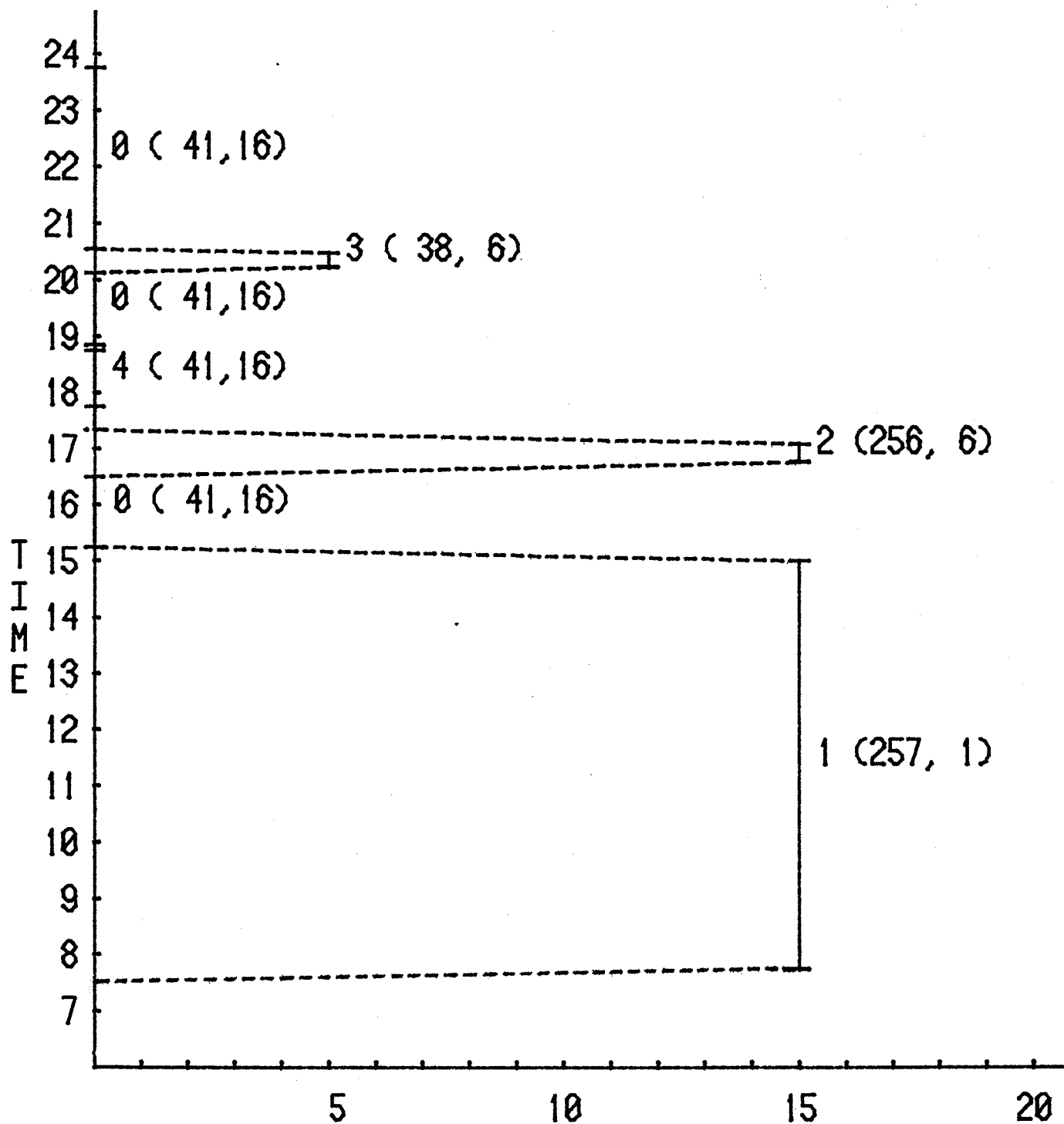
11



HOUSEHOLD: 74

PERSON: 1

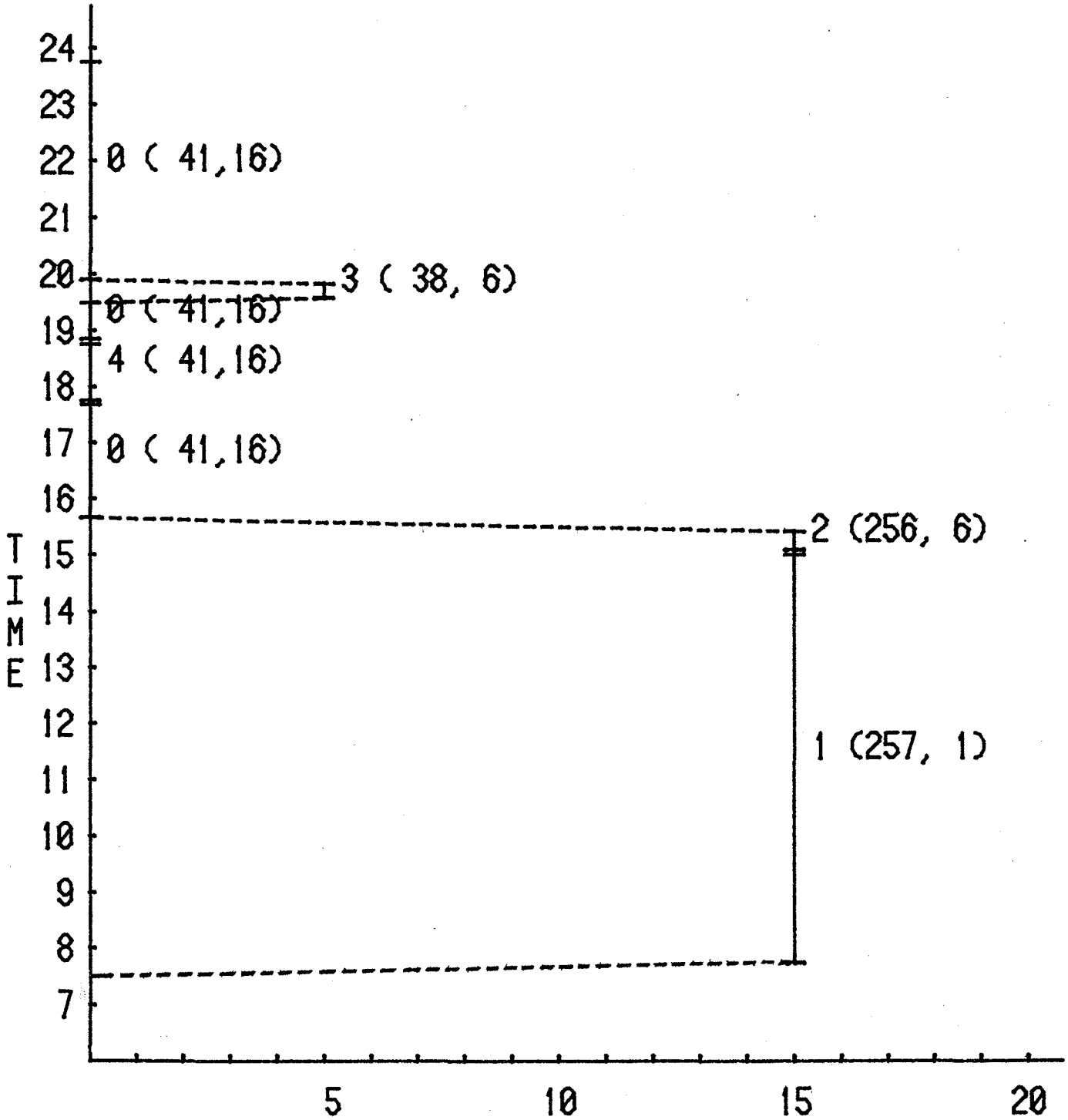
45



HOUSEHOLD: 74

PERSON: 1

108

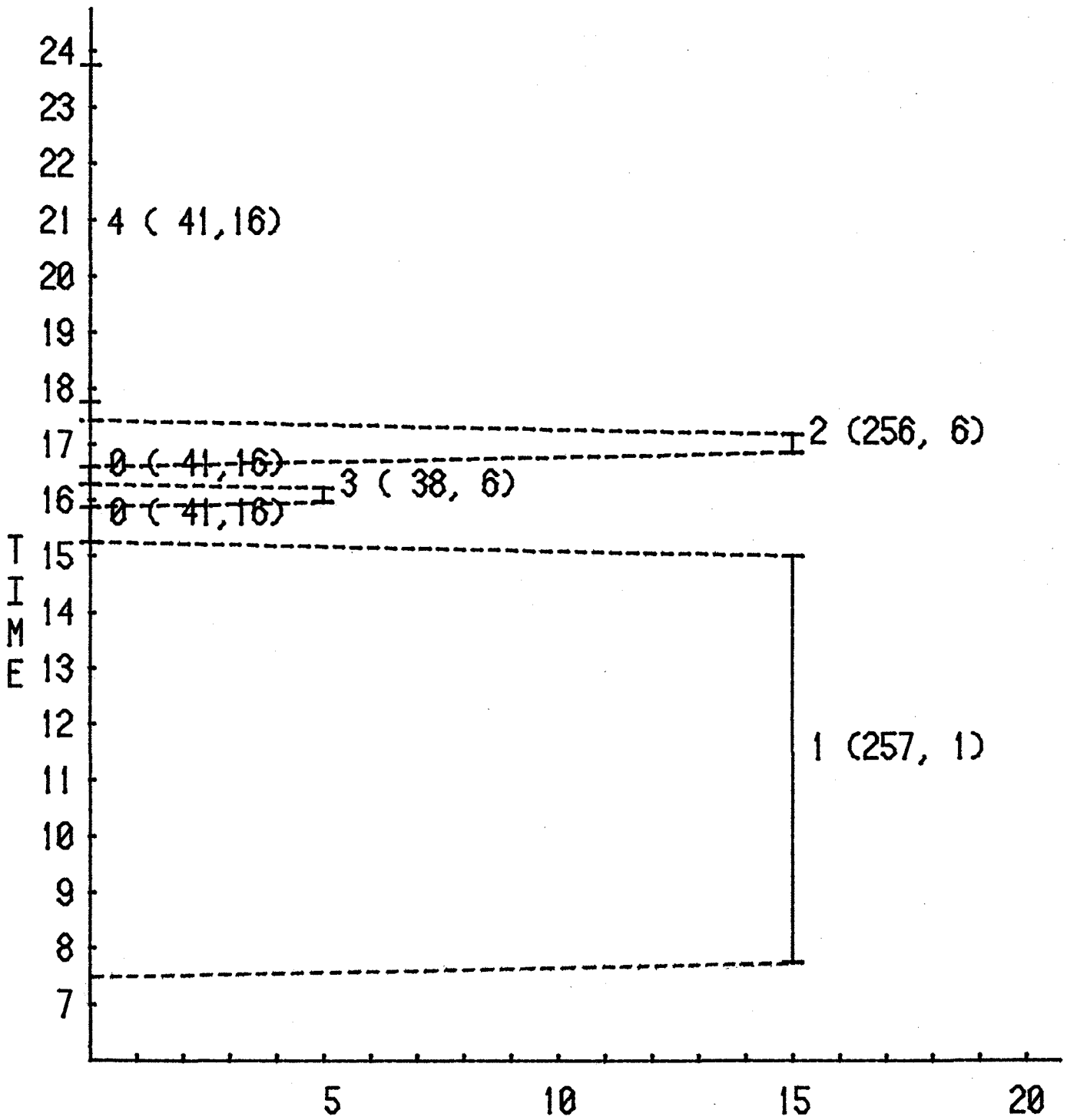


TRAVEL TIME FROM HOME

HOUSEHOLD: 74

PERSON: 1

117



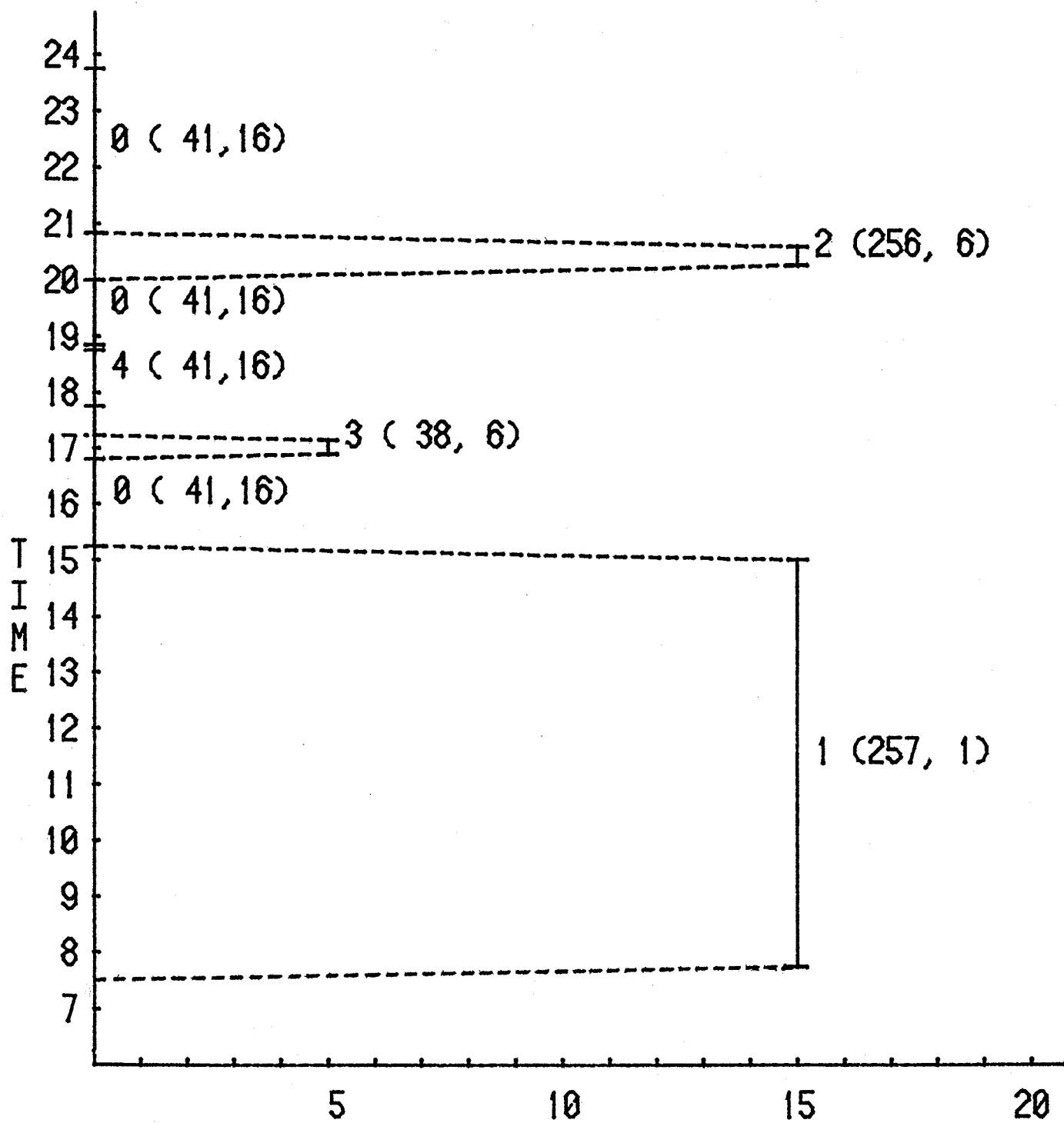
TRAVEL TIME FROM HOME

HOUSEHOLD: 74

PERSON: 1

CHOSEN

131

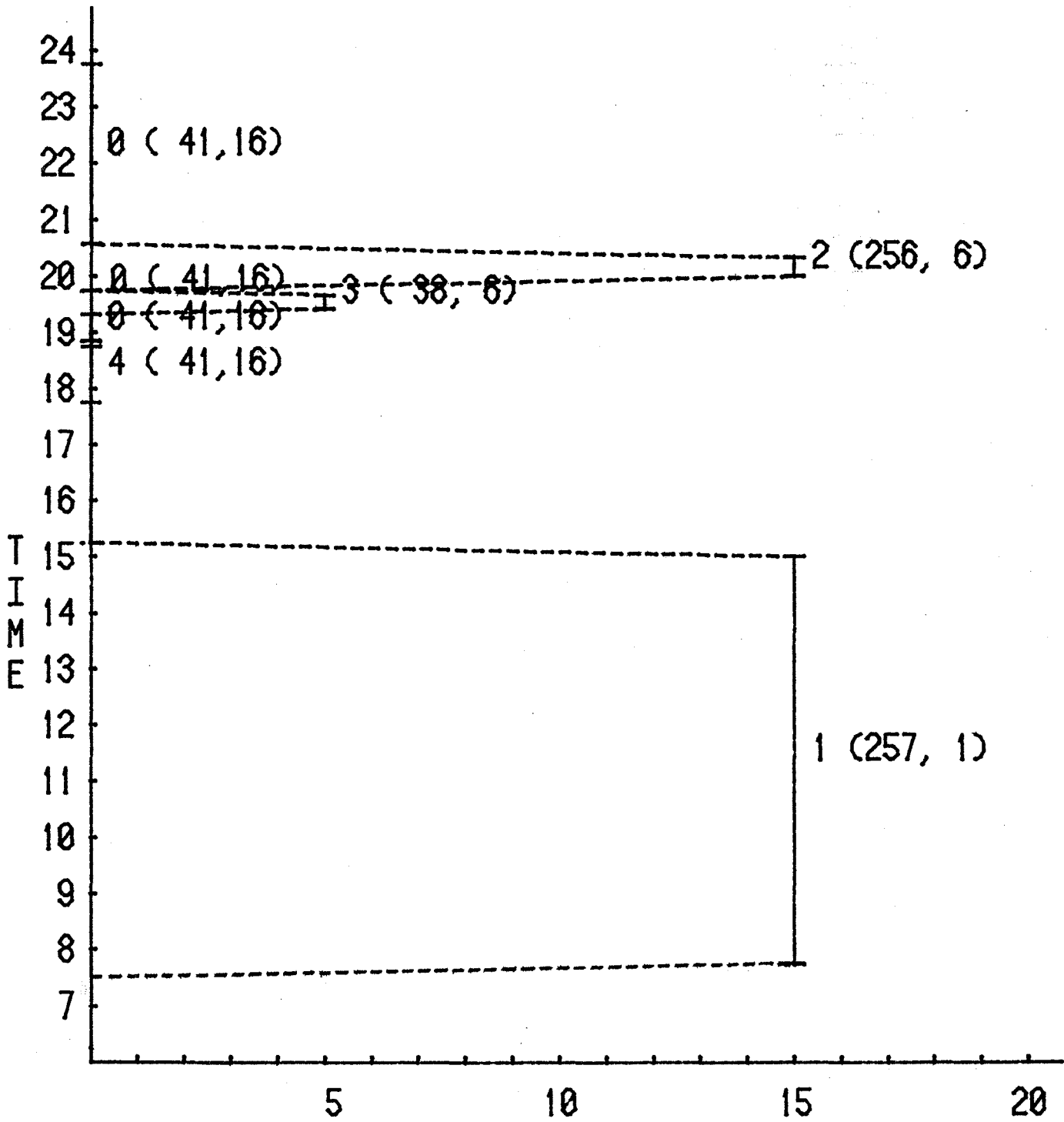


TRAVEL TIME FROM HOME

HOUSEHOLD: 74

PERSON: 1

156

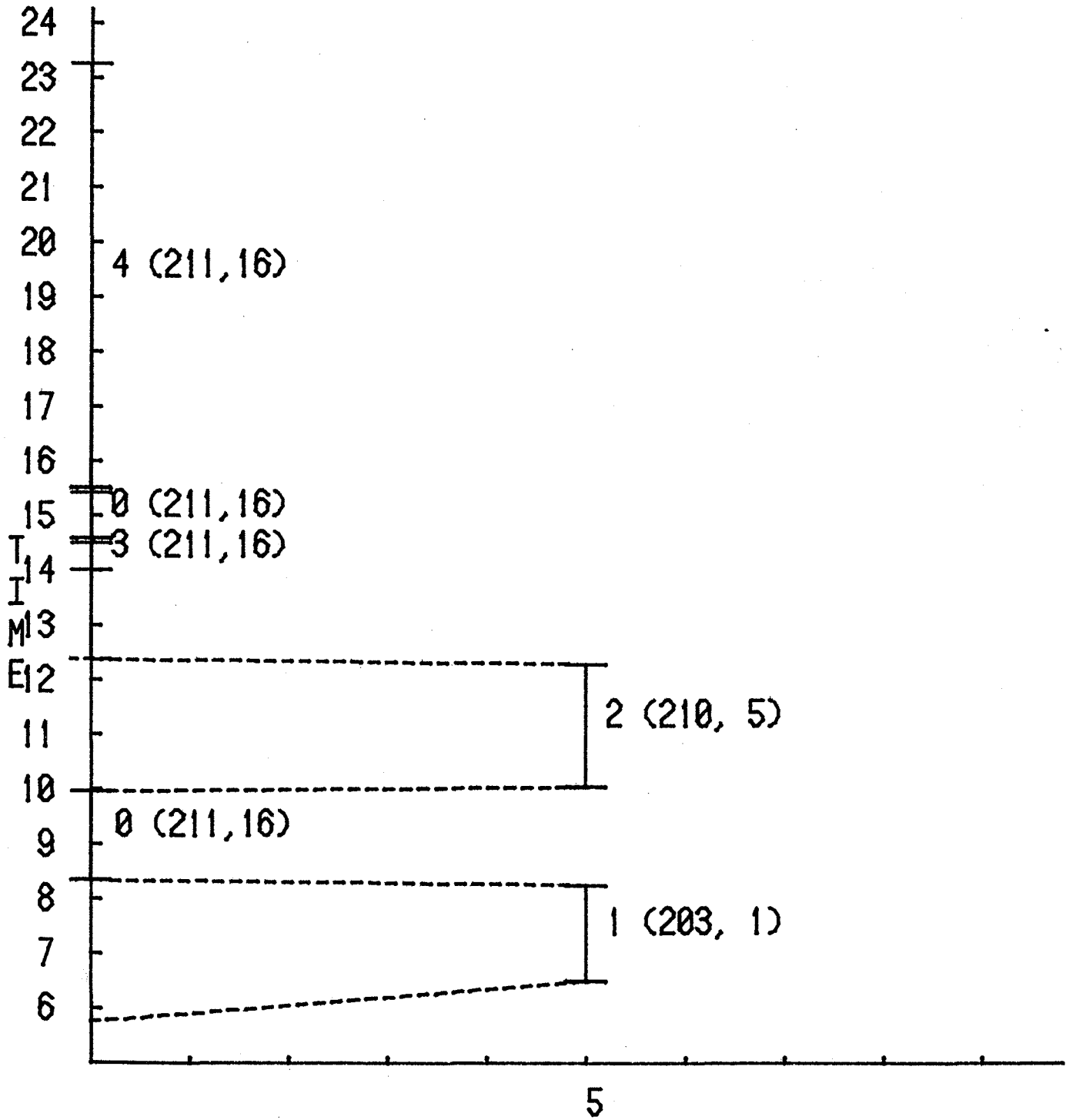


TRAVEL TIME FROM HOME

HOUSEHOLD: 74

PERSON: 1

209

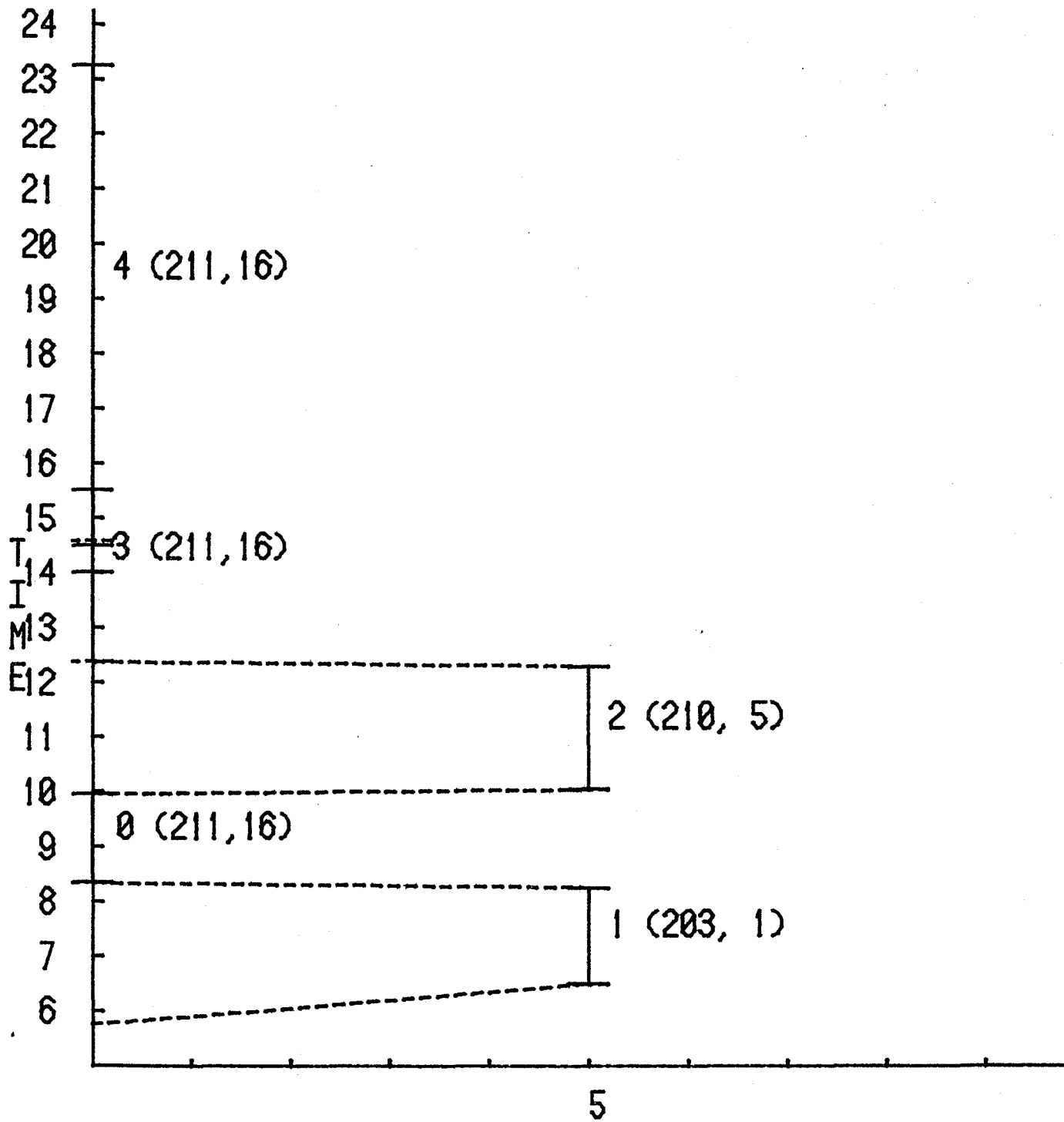


TRAVEL TIME FROM HOME

HOUSEHOLD: 82

PERSON: 1

20

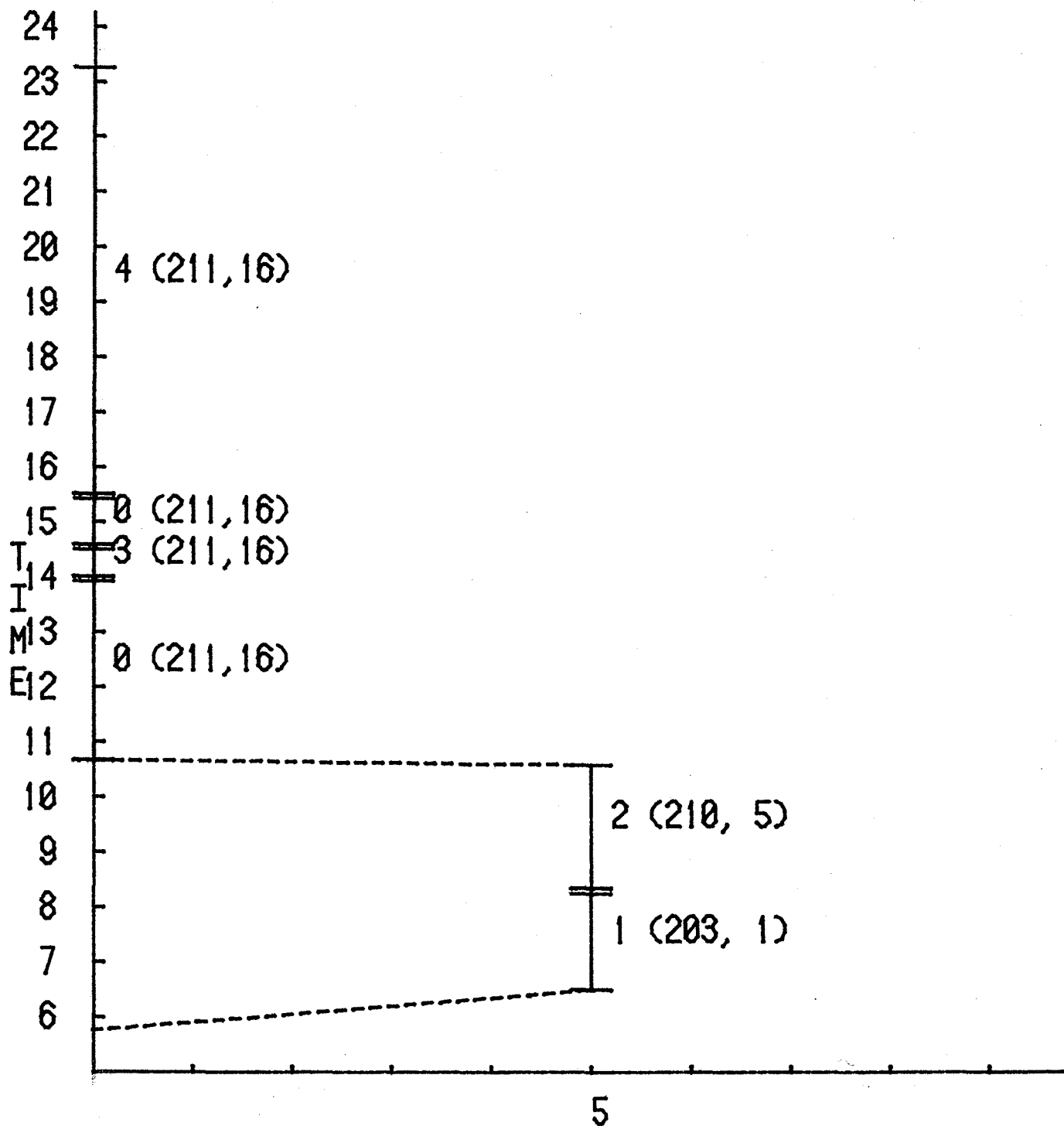


TRAVEL TIME FROM HOME

HOUSEHOLD: 82

PERSON: 1

5



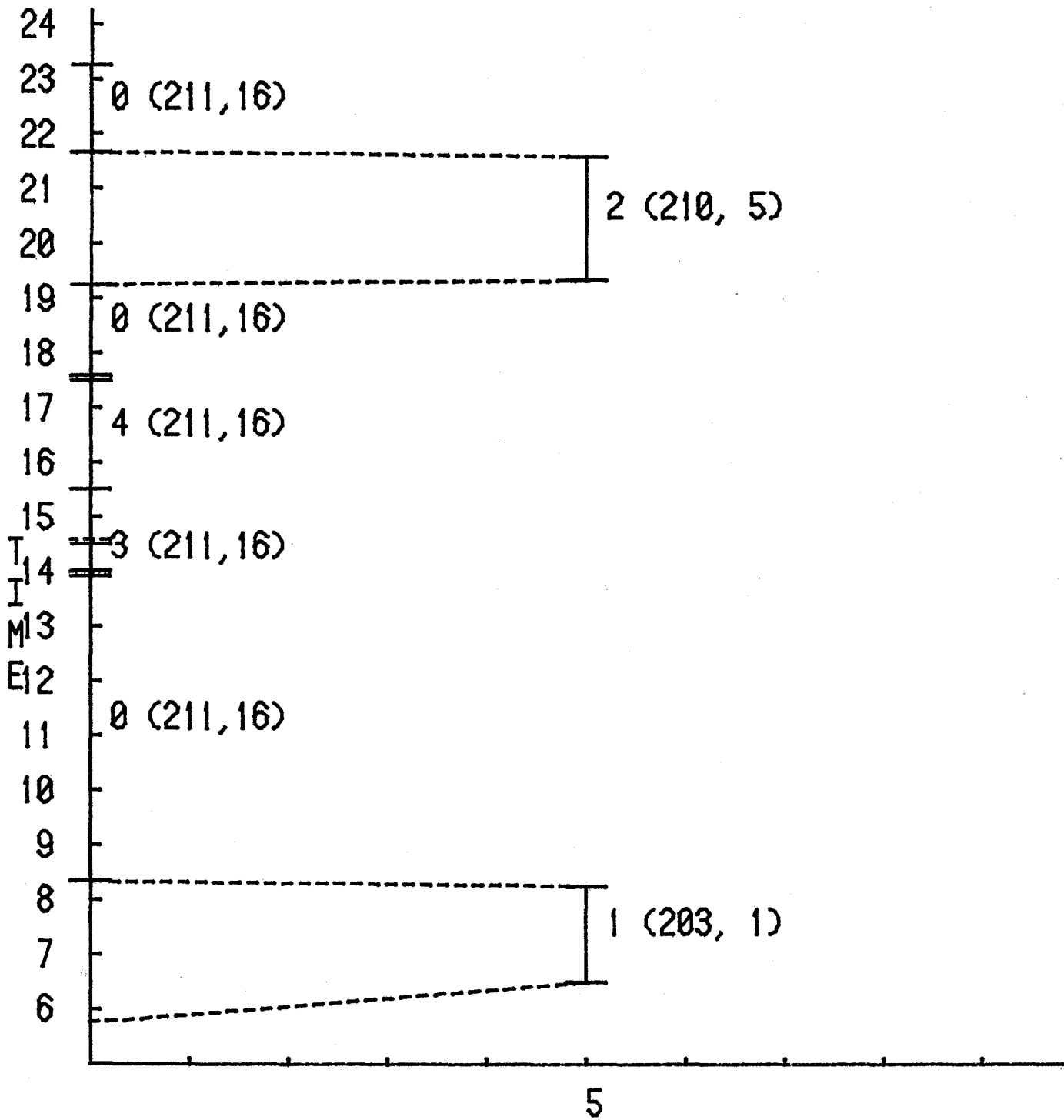
TRAVEL TIME FROM HOME

HOUSEHOLD: 82

PERSON: 1

CHOSEN

23

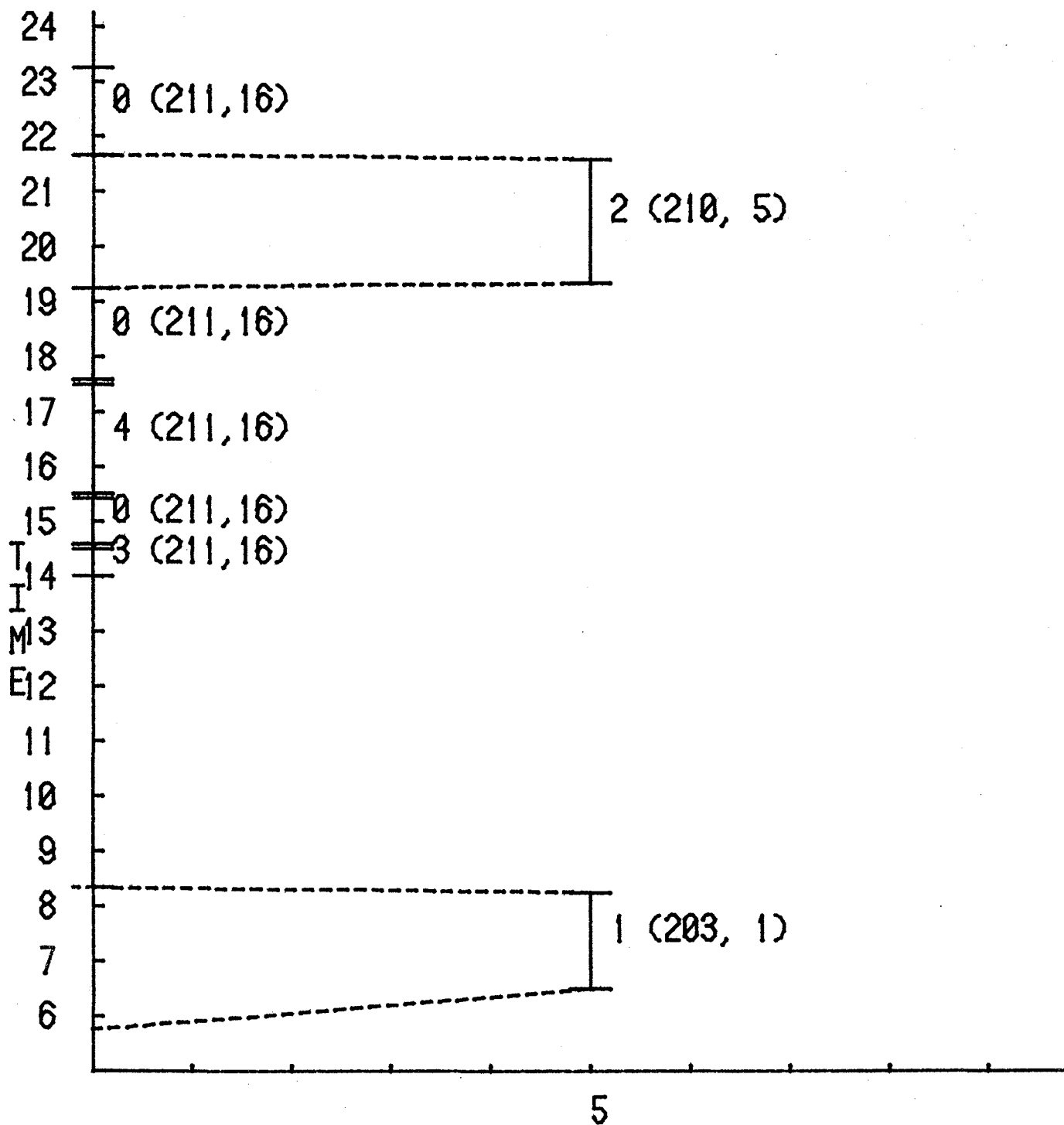


TRAVEL TIME FROM HOME

HOUSEHOLD: 82

PERSON: 1

27

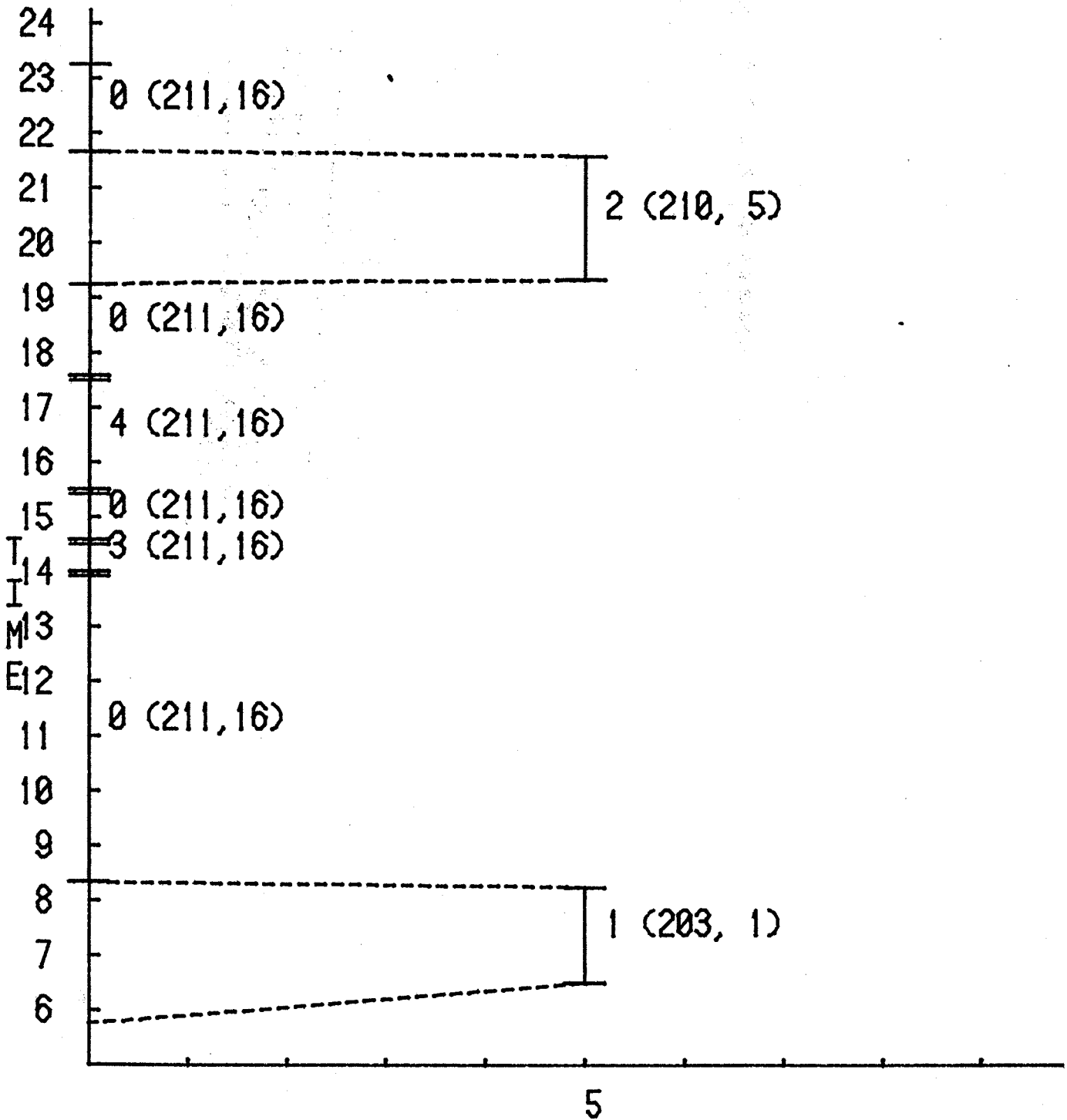


TRAVEL TIME FROM HOME

HOUSEHOLD: 82

PERSON: 1

32

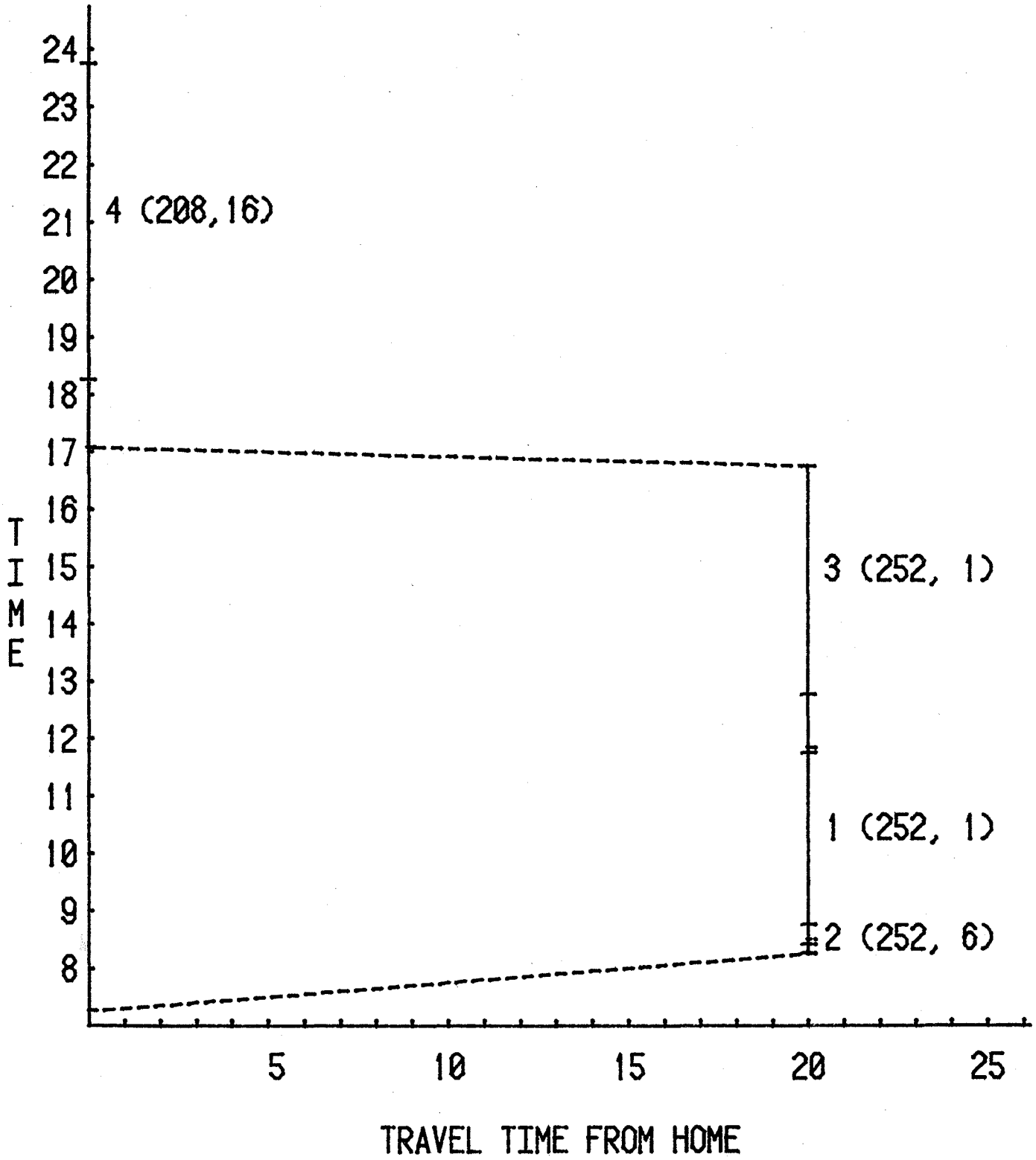


TRAVEL TIME FROM HOME

HOUSEHOLD: 82

PERSON: 1

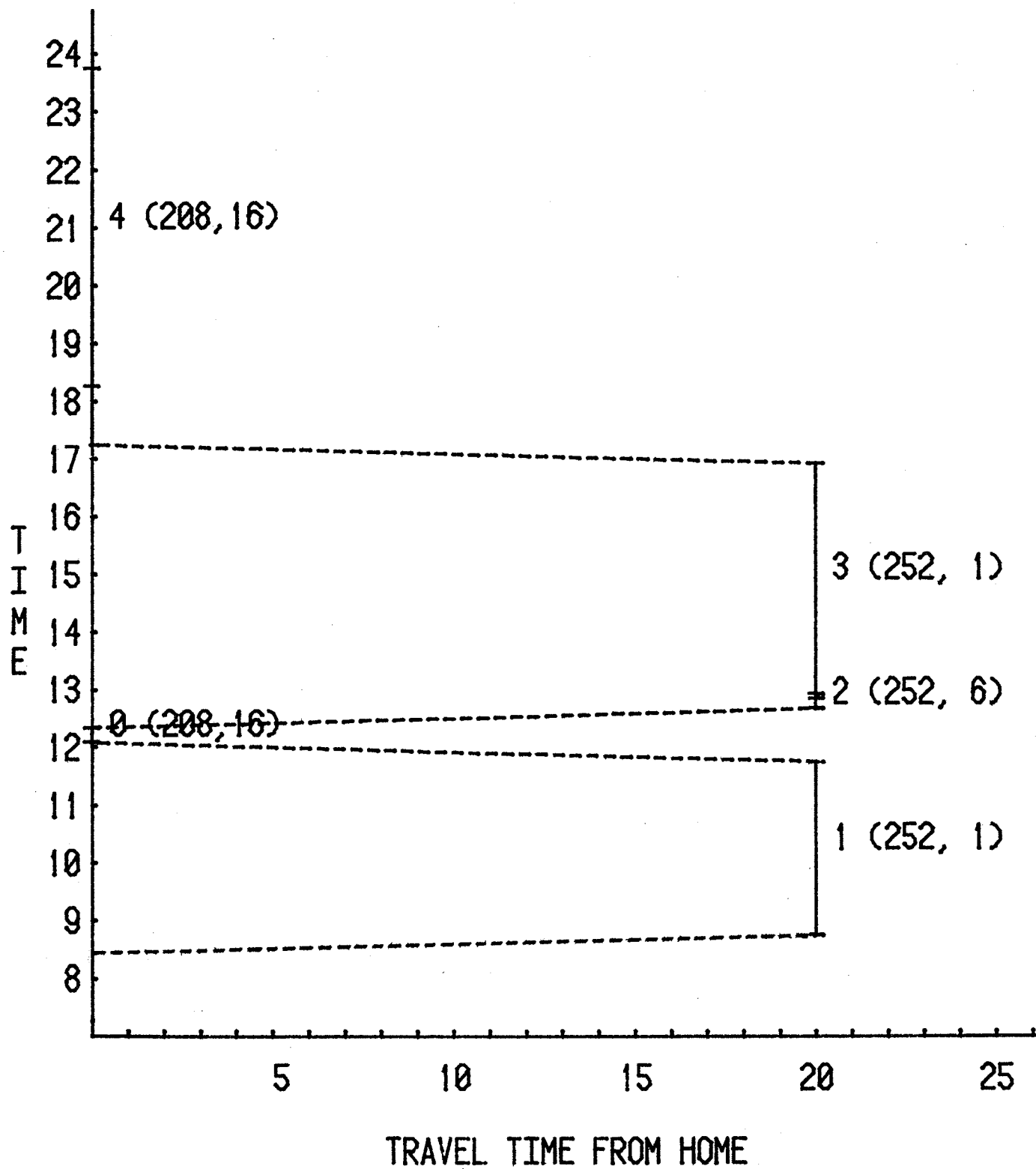
38



HOUSEHOLD: 86

PERSON: 1

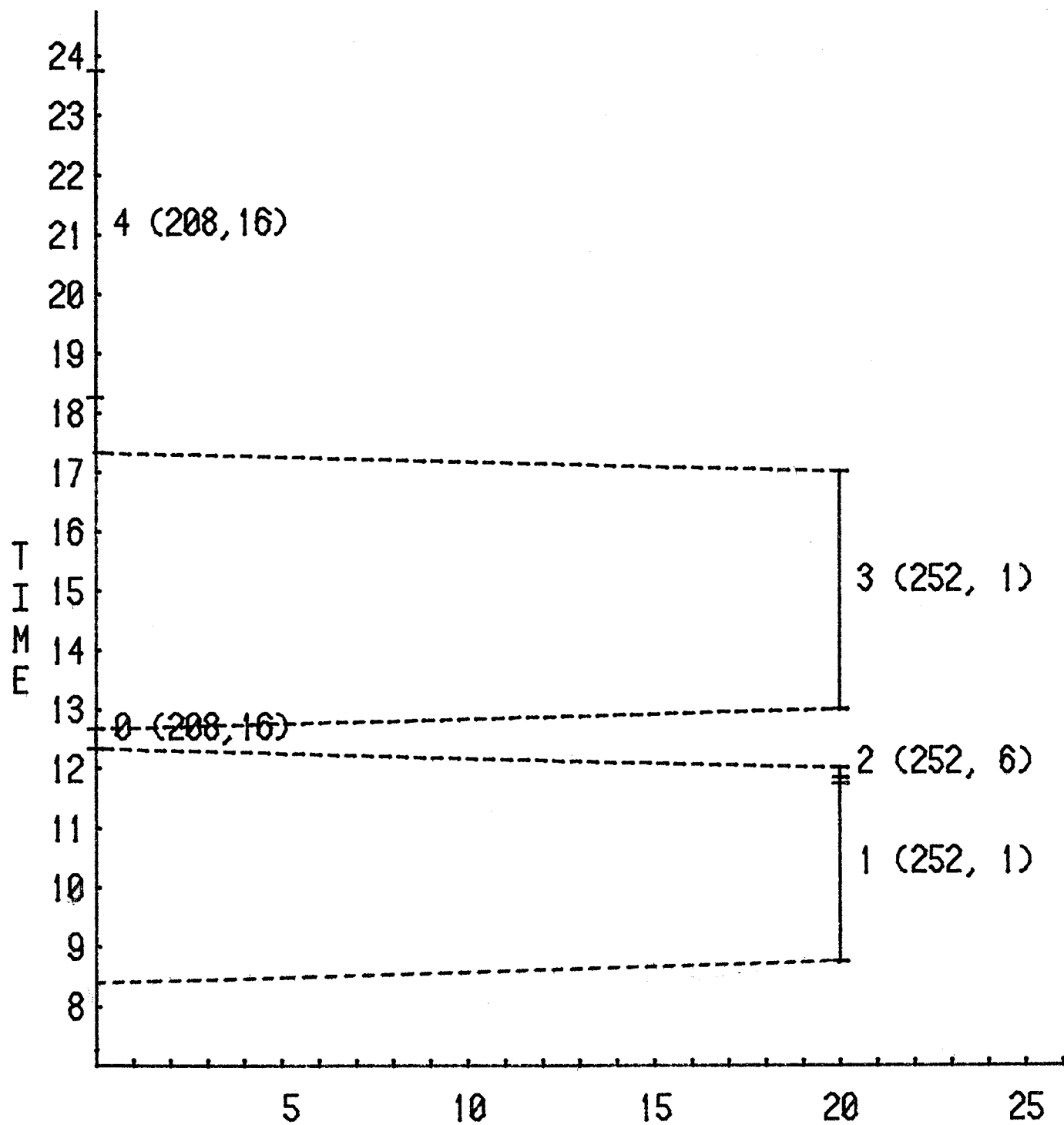
5



HOUSEHOLD: 86

PERSON: 1

7

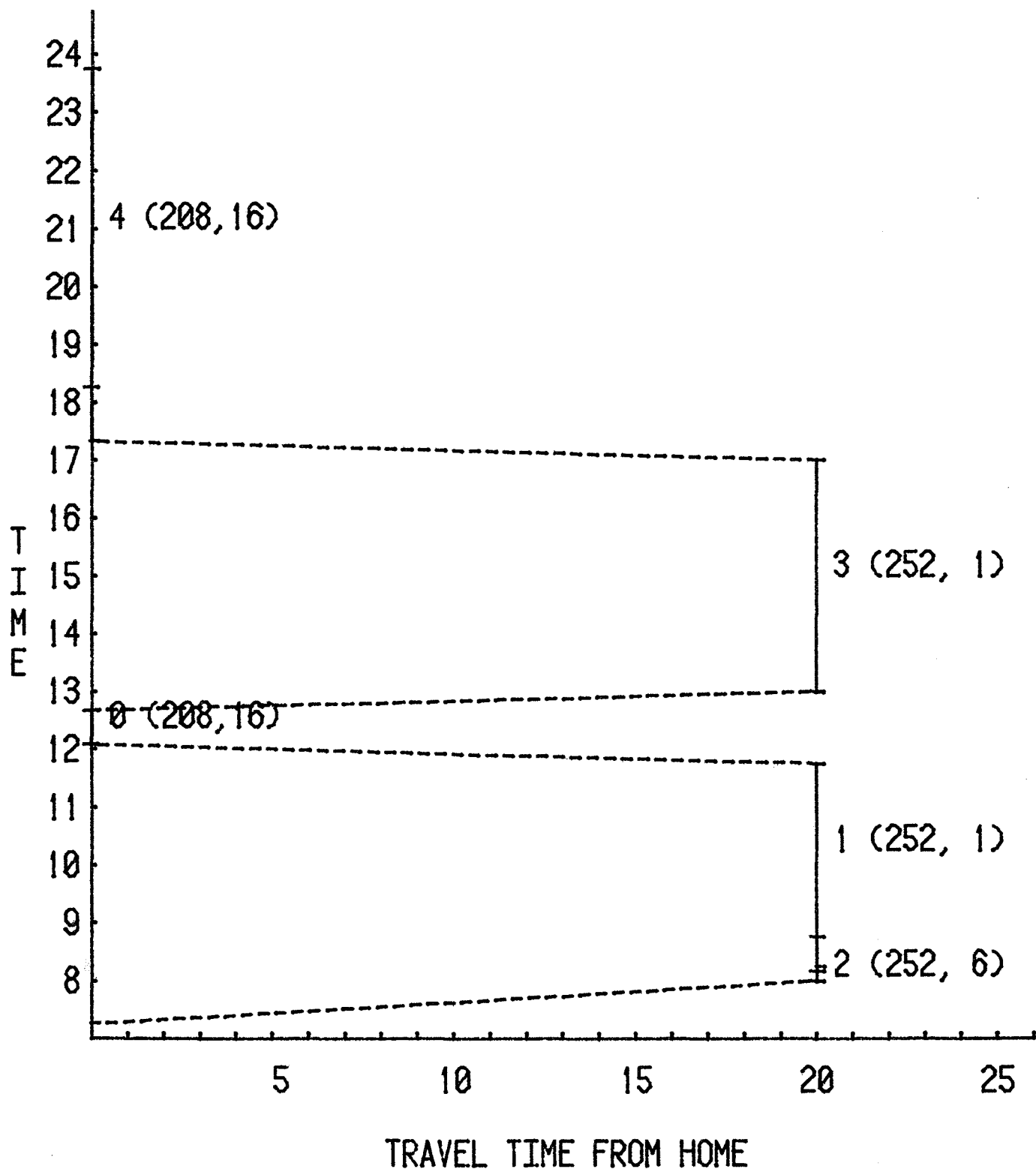


TRAVEL TIME FROM HOME

HOUSEHOLD: 86

PERSON: 1

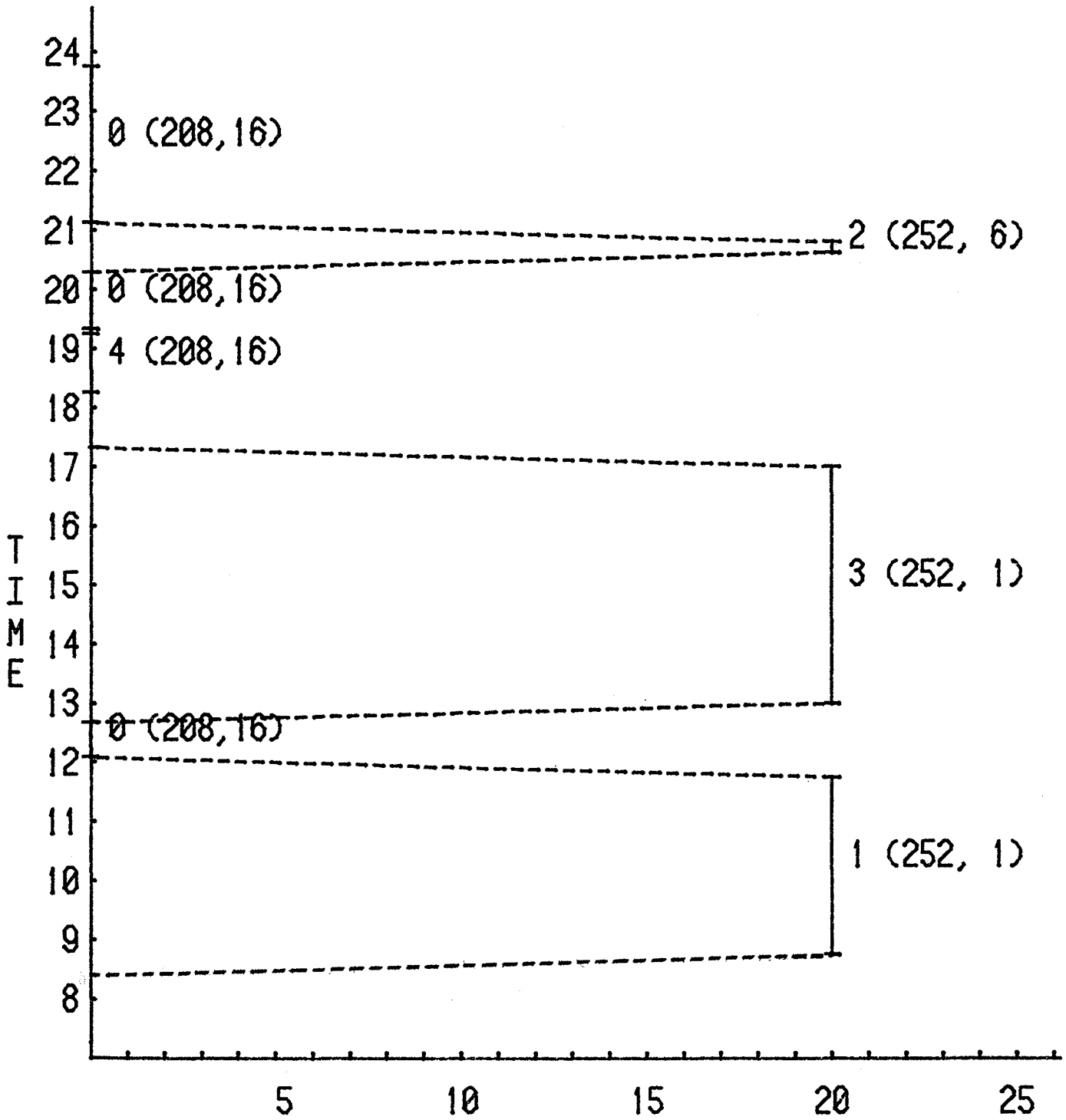
10



HOUSEHOLD: 86

PERSON: 1

29

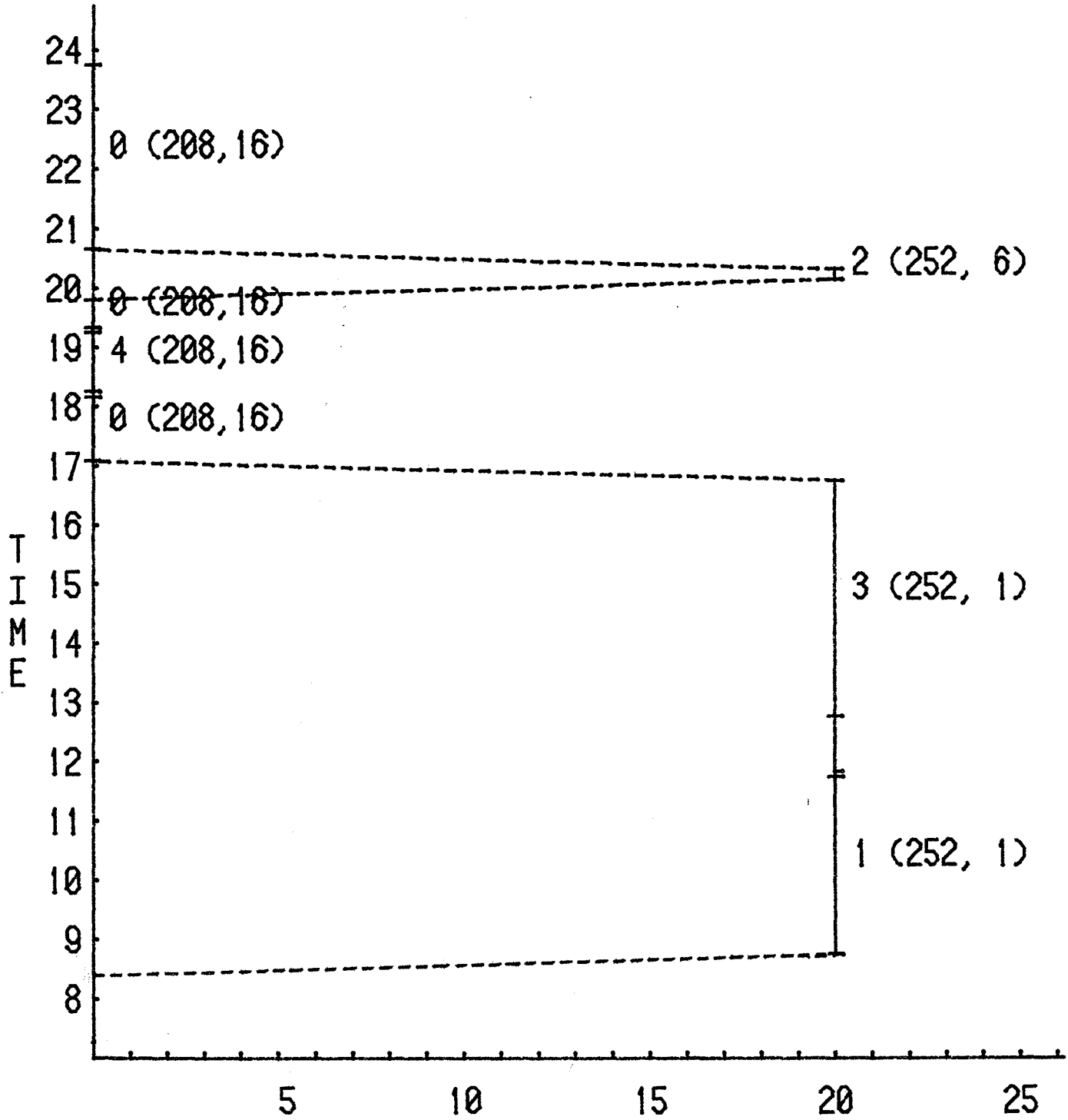


TRAVEL TIME FROM HOME

HOUSEHOLD: 86

PERSON: 1

51

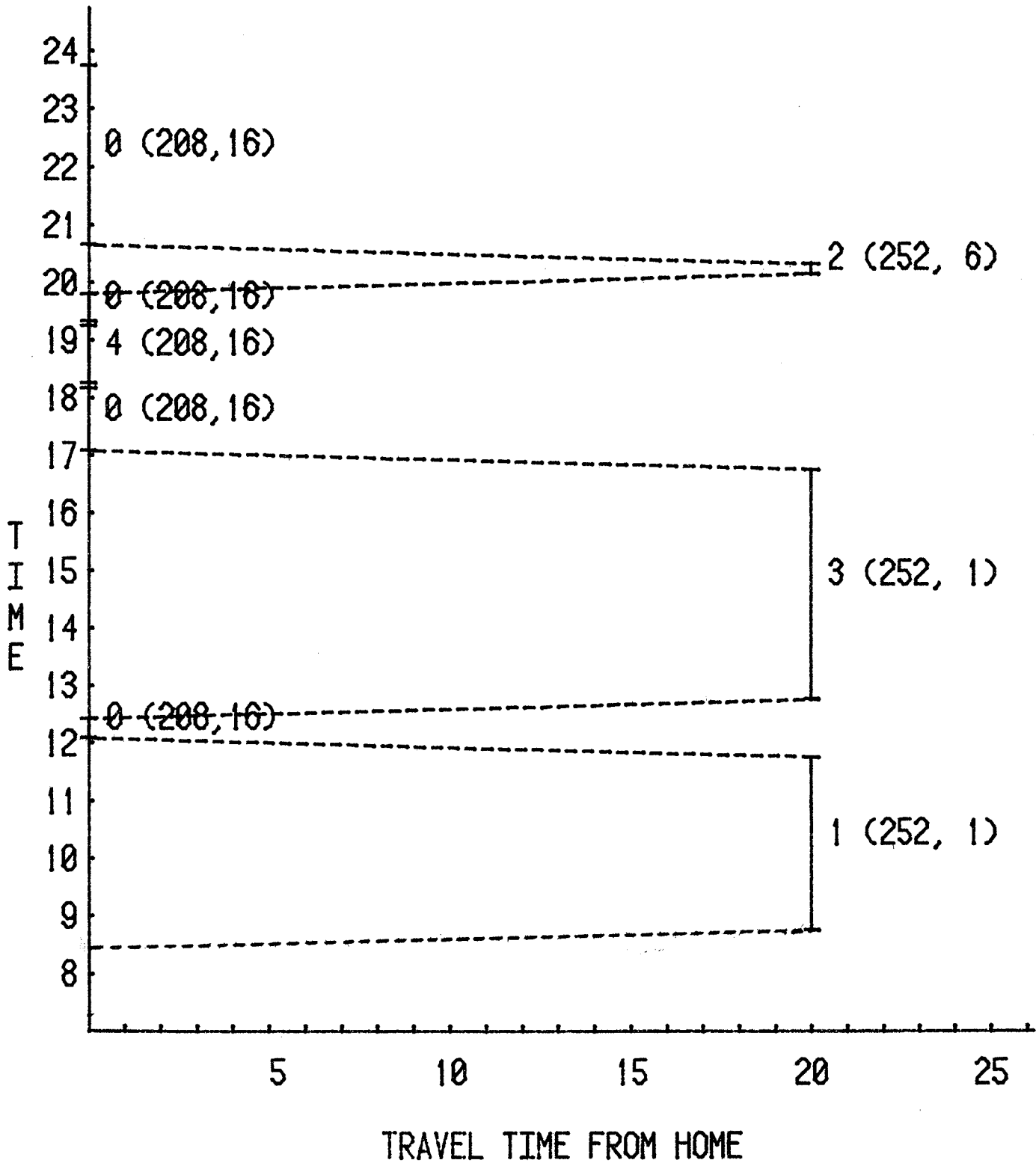


TRAVEL TIME FROM HOME

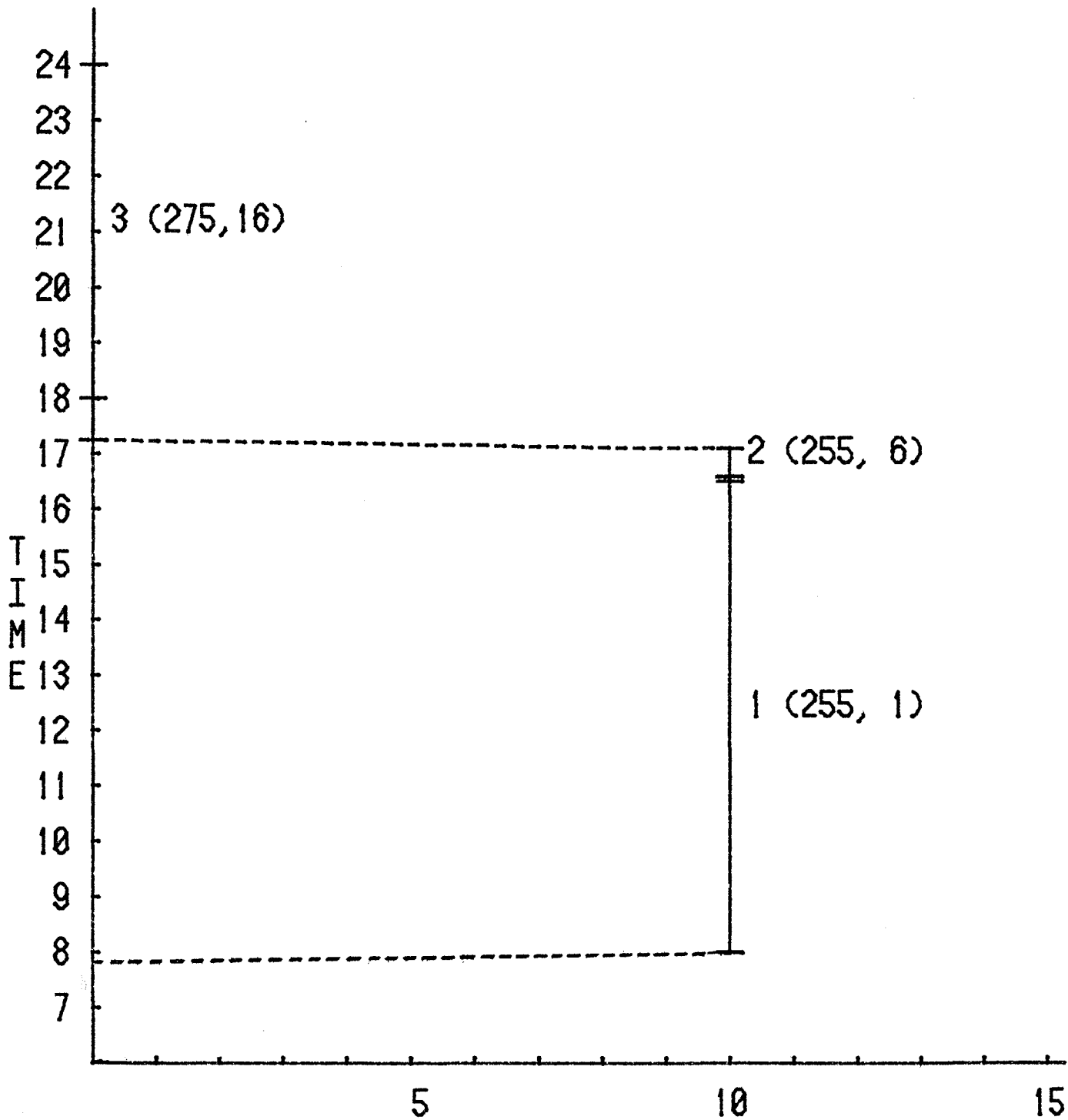
HOUSEHOLD: 86

PERSON: 1

60



HOUSEHOLD: 86 PERSON: 1 CHOSEN 68

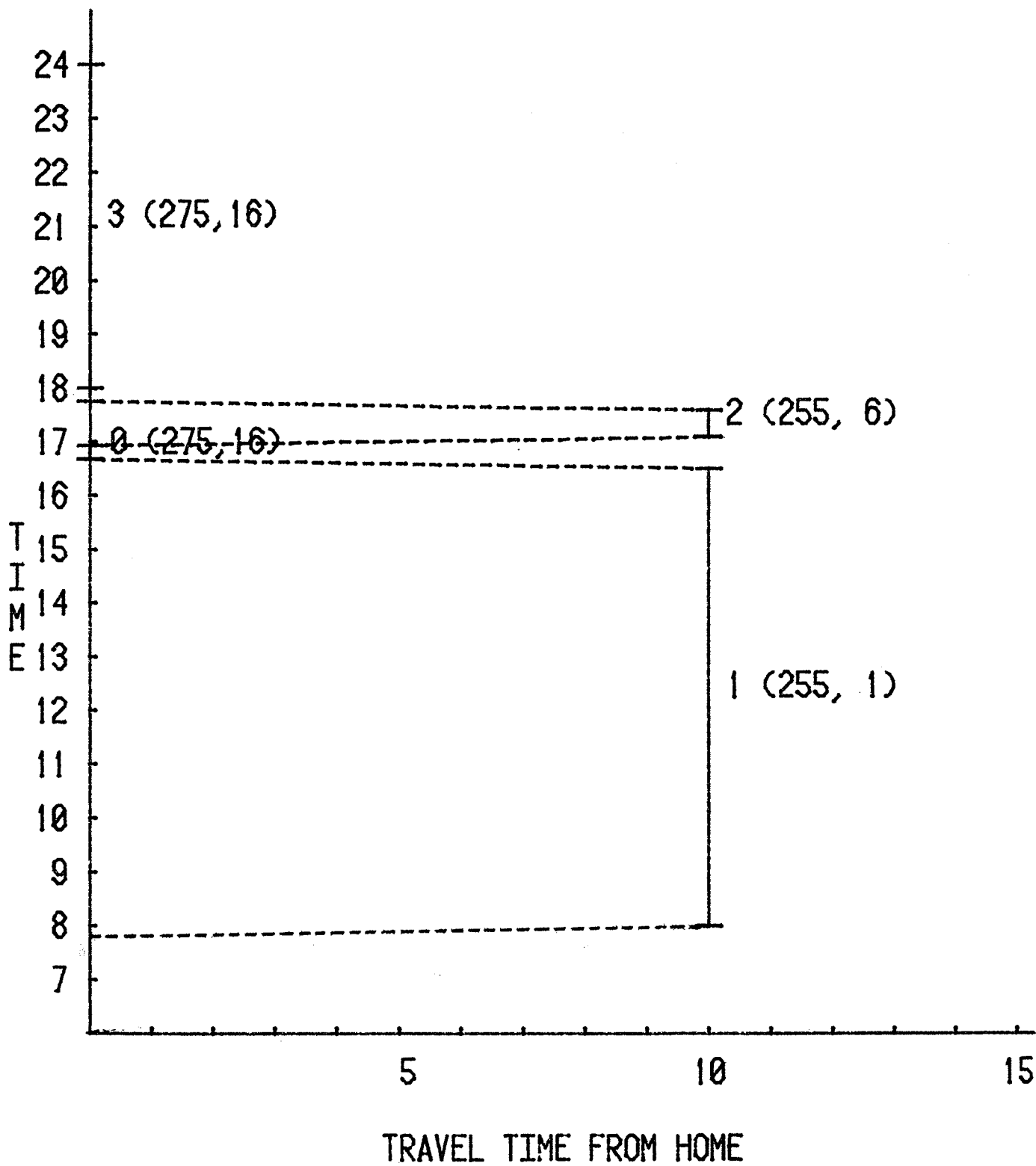


TRAVEL TIME FROM HOME

HOUSEHOLD: 87

PERSON: 1

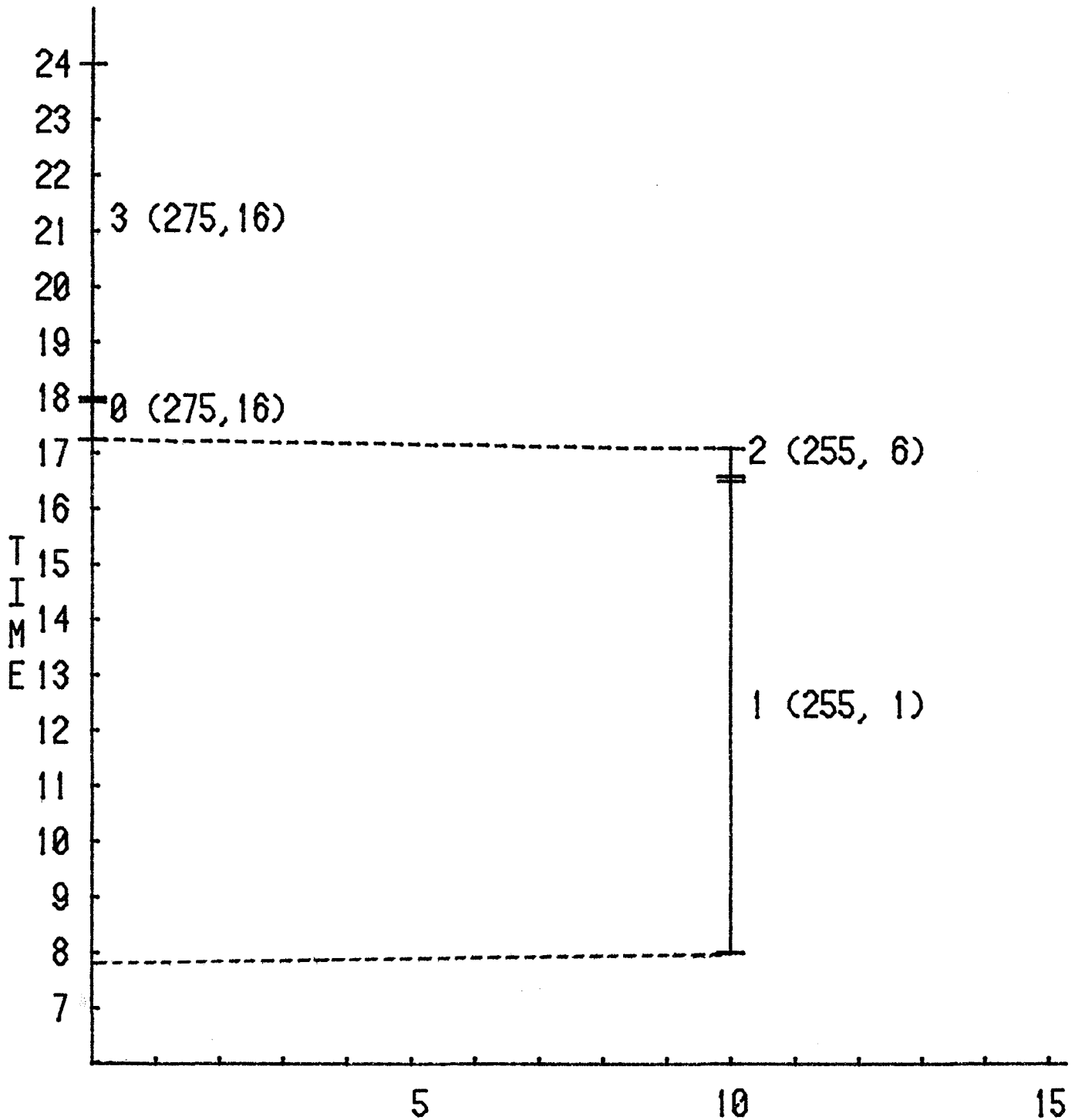
1



HOUSEHOLD: 87

PERSON: 1

4

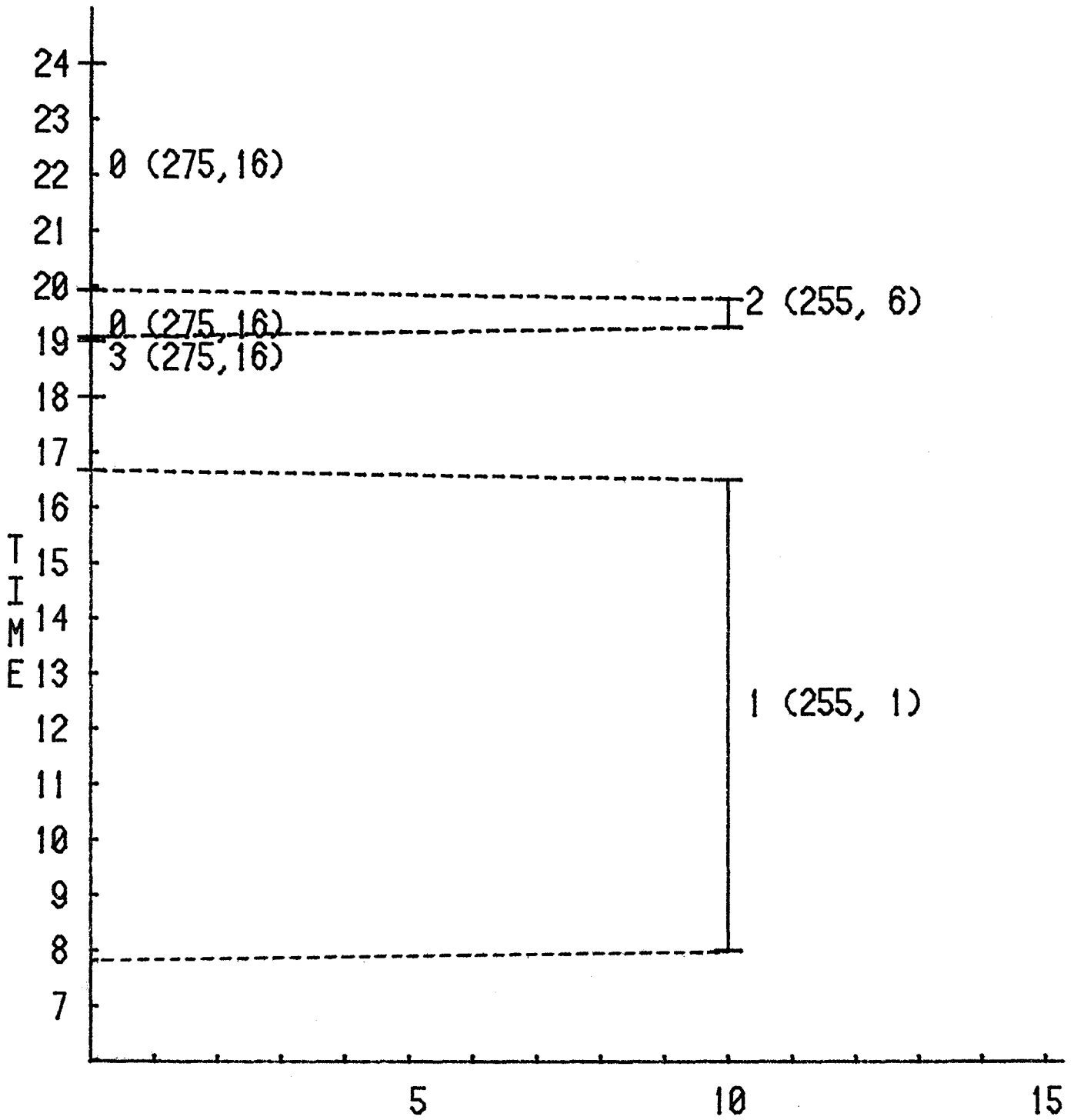


TRAVEL TIME FROM HOME

HOUSEHOLD: 87

PERSON: 1

6

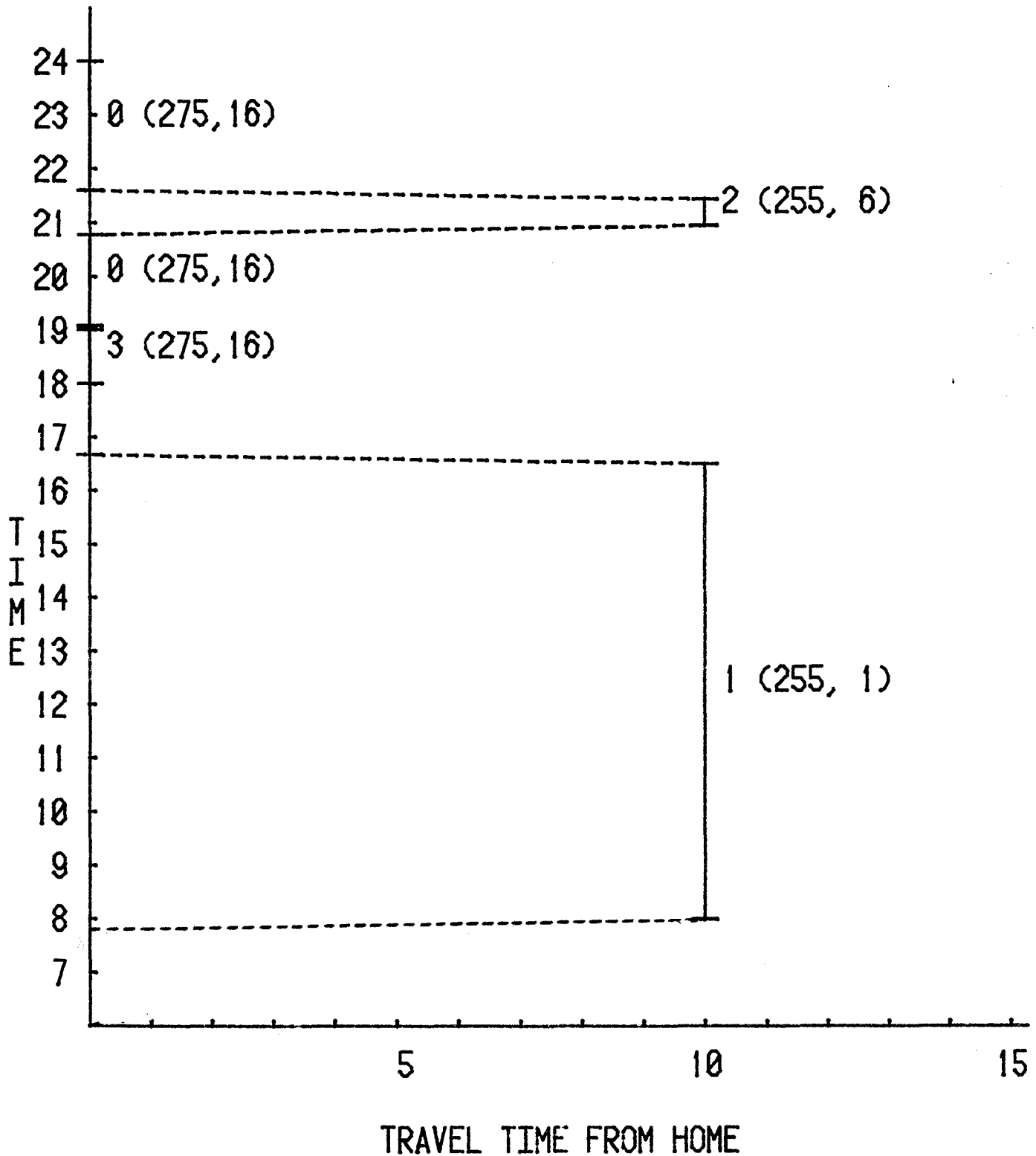


TRAVEL TIME FROM HOME

HOUSEHOLD: 87

PERSON: 1

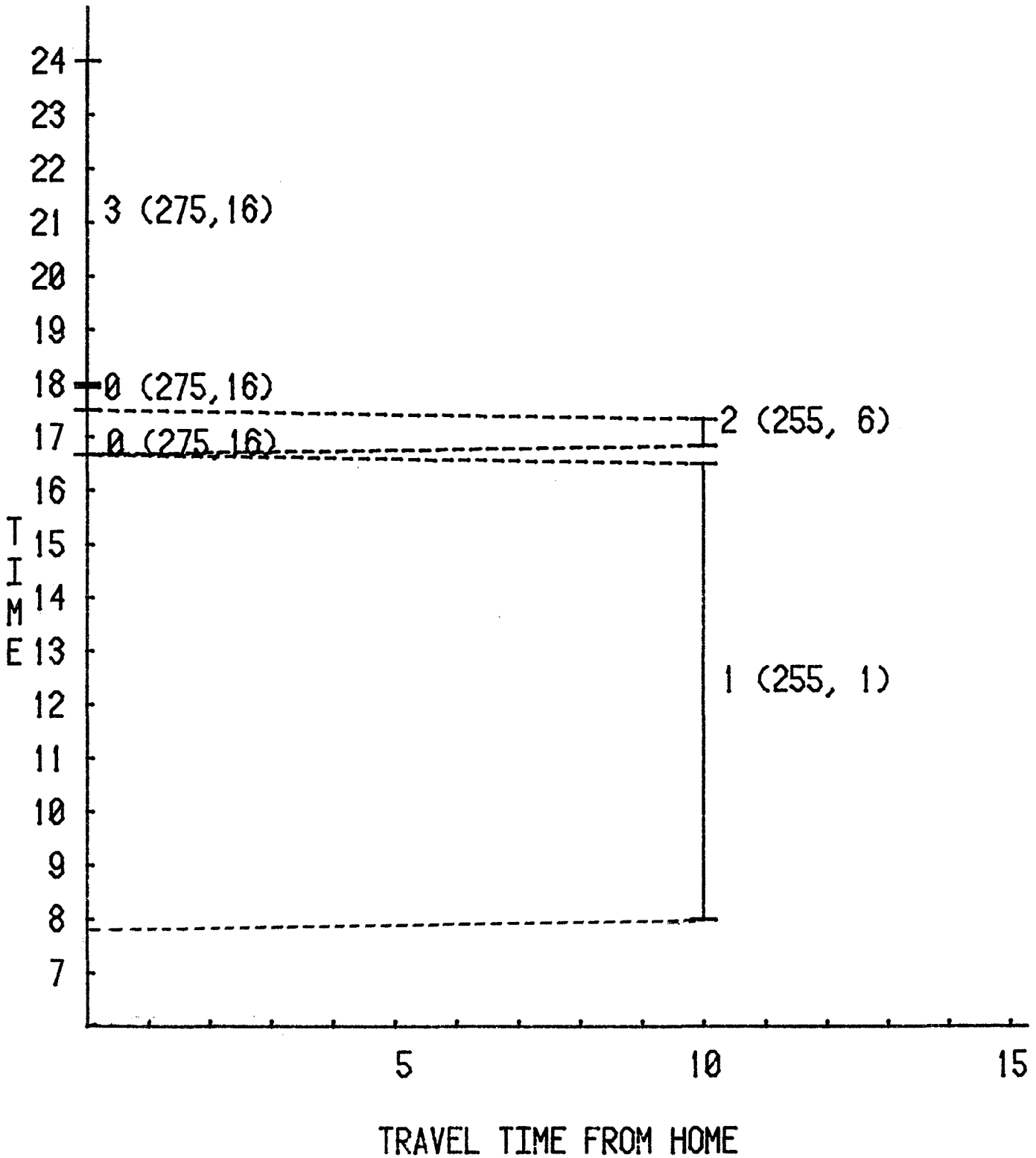
8



HOUSEHOLD: 87

PERSON: 1

11

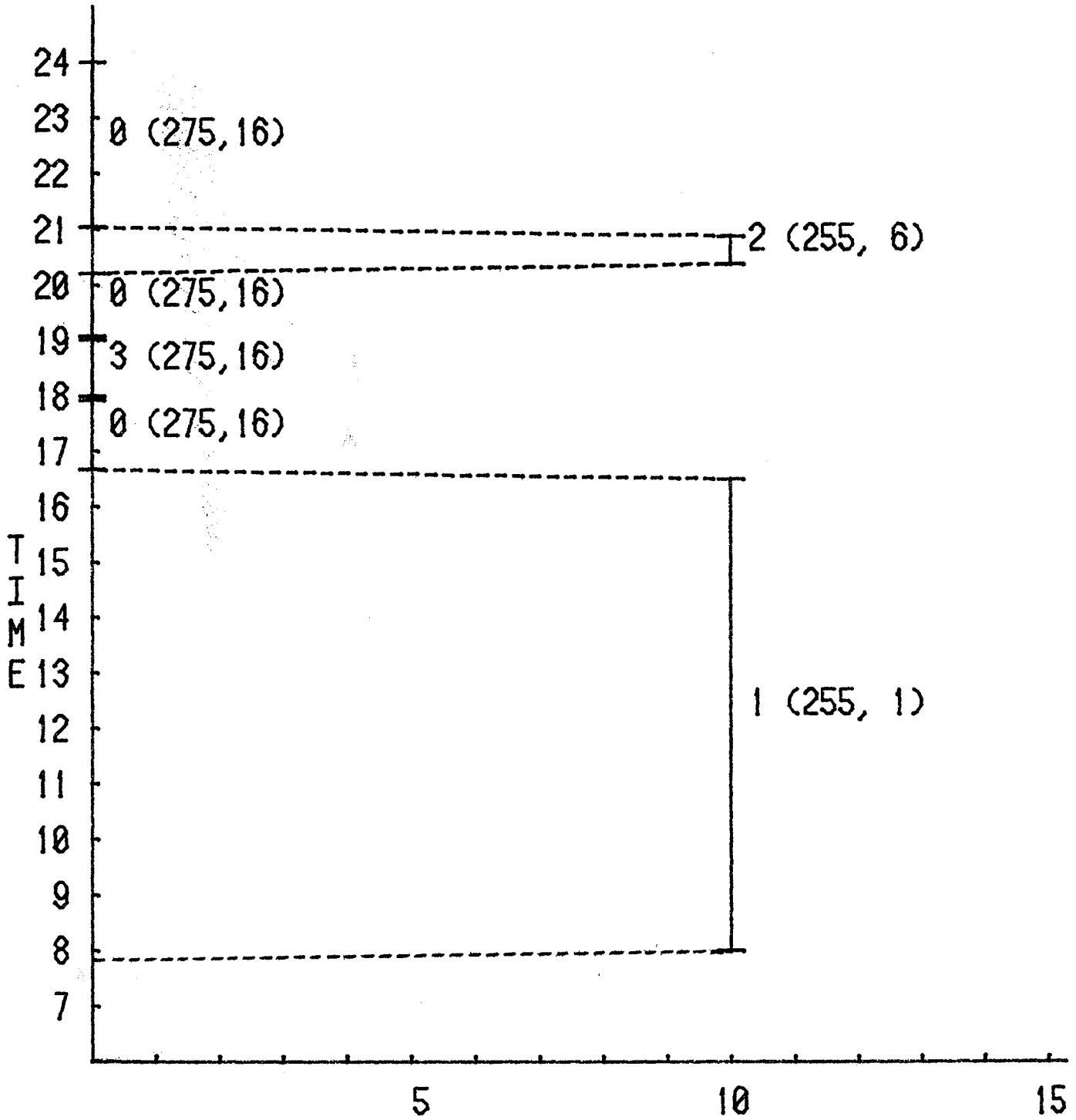


HOUSEHOLD: 87

PERSON: 1

CHOSEN

13

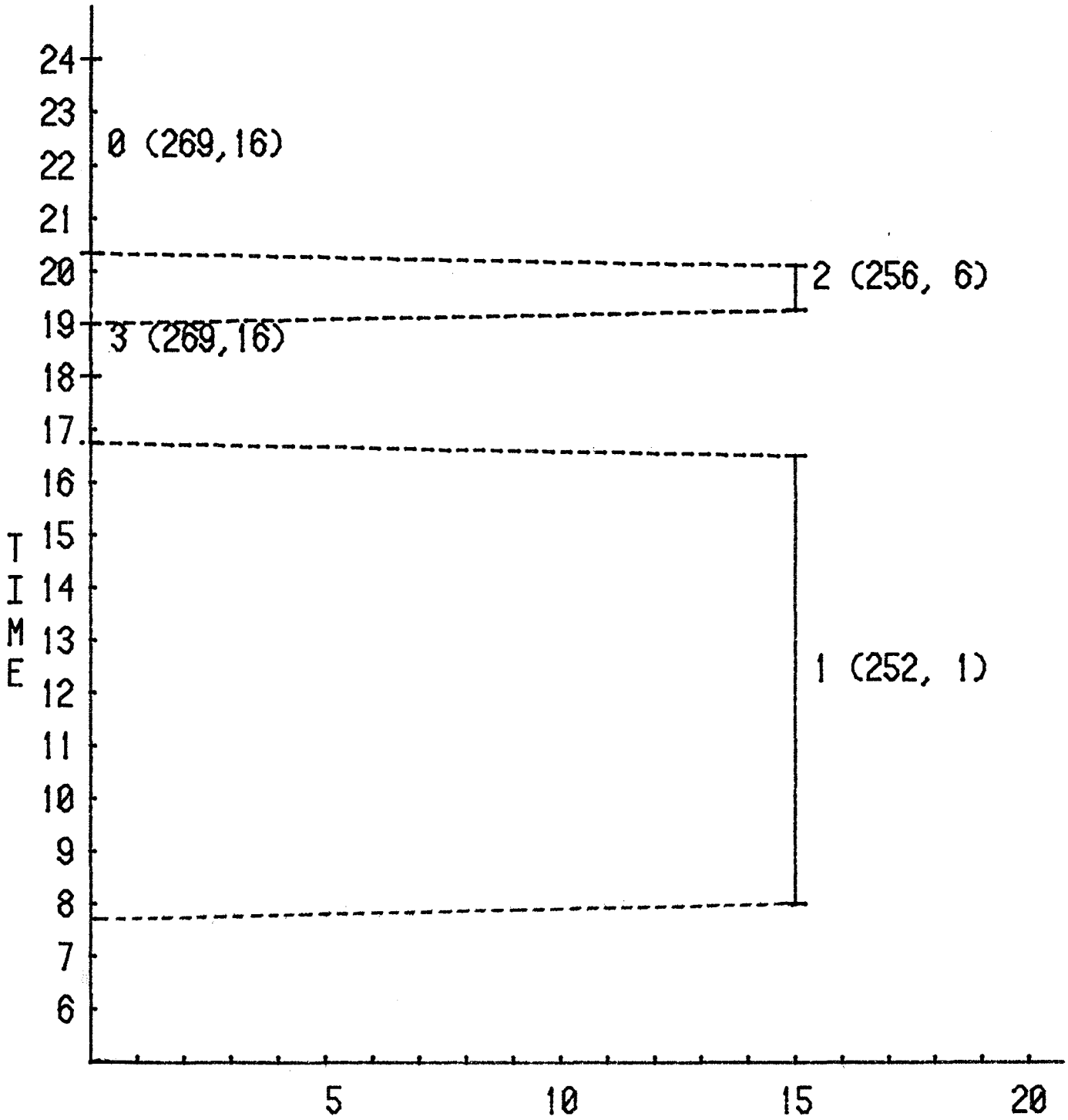


TRAVEL TIME FROM HOME

HOUSEHOLD: 87

PERSON: 1

16

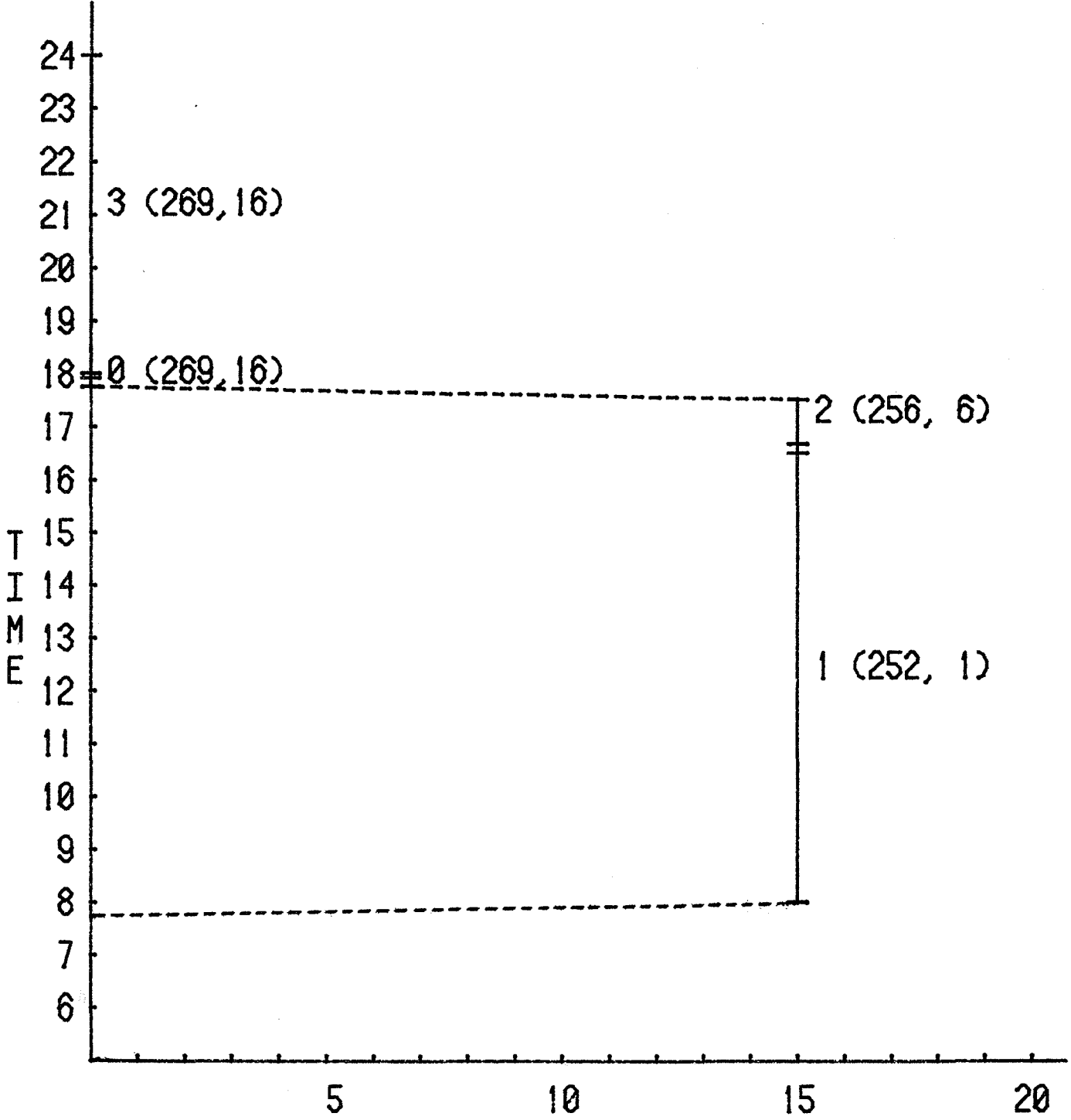


TRAVEL TIME FROM HOME

HOUSEHOLD: 92

PERSON: 1

2

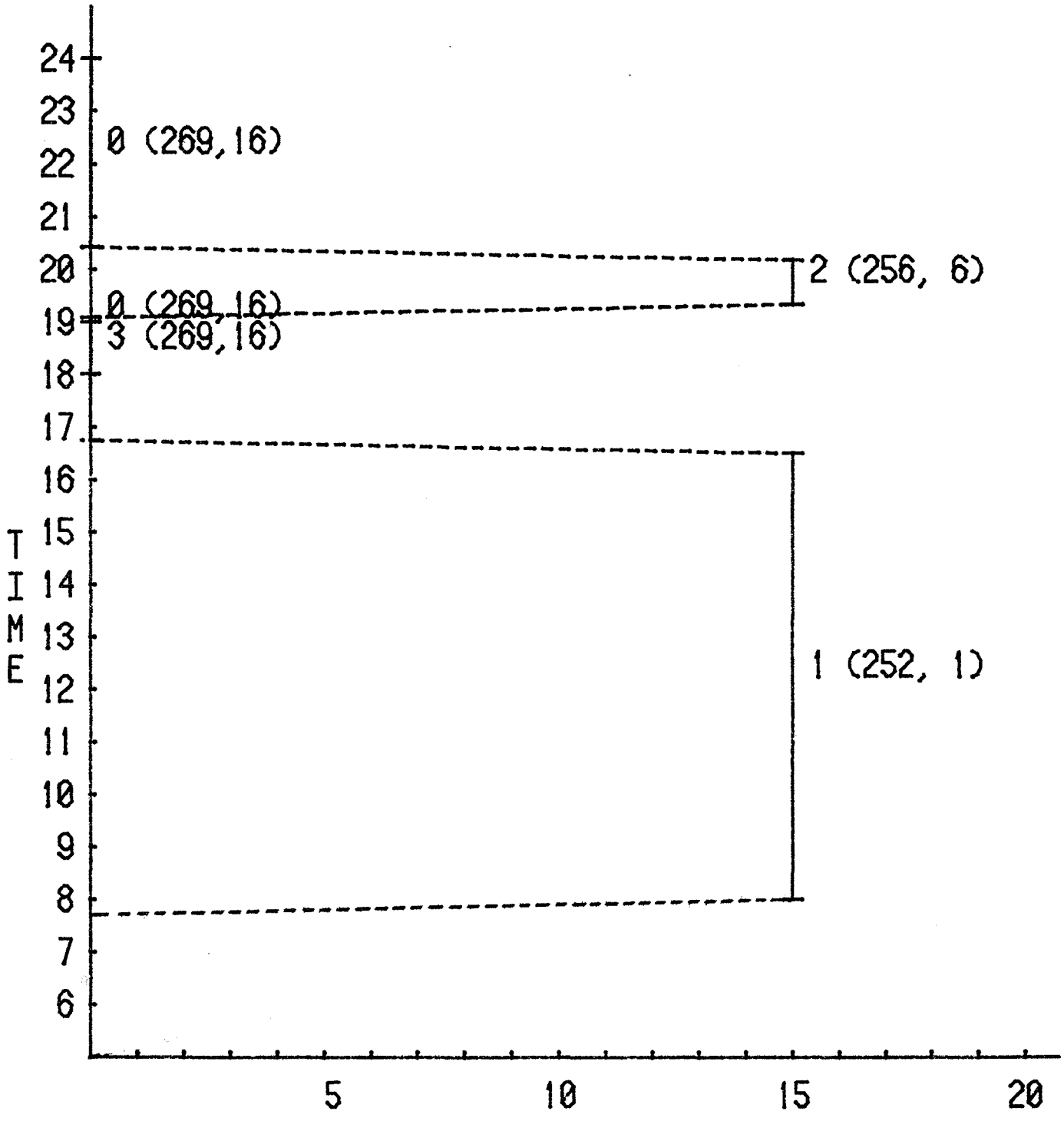


TRAVEL TIME FROM HOME

HOUSEHOLD: 92

PERSON: 1

3

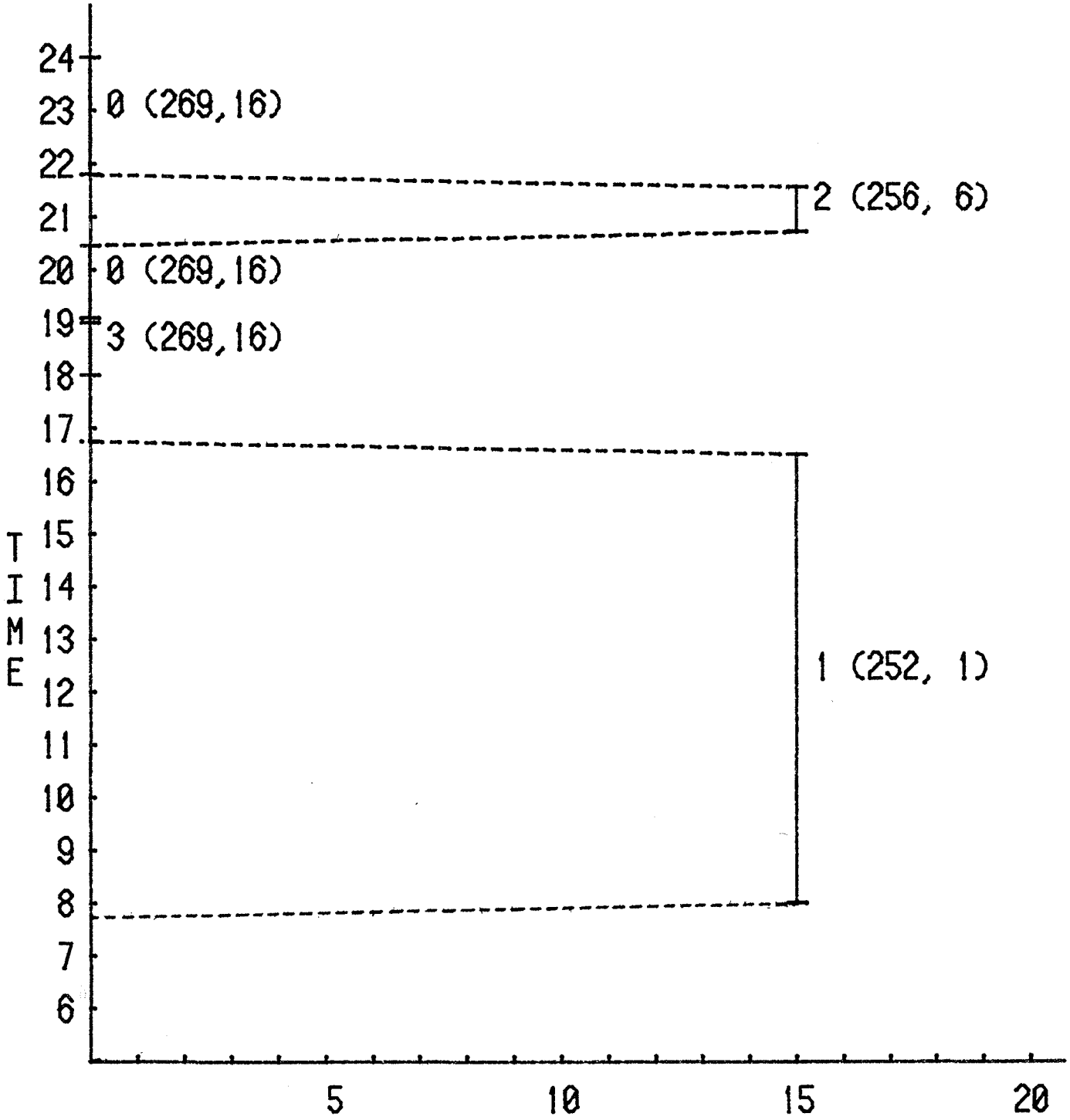


TRAVEL TIME FROM HOME

HOUSEHOLD: 92

PERSON: 1

5

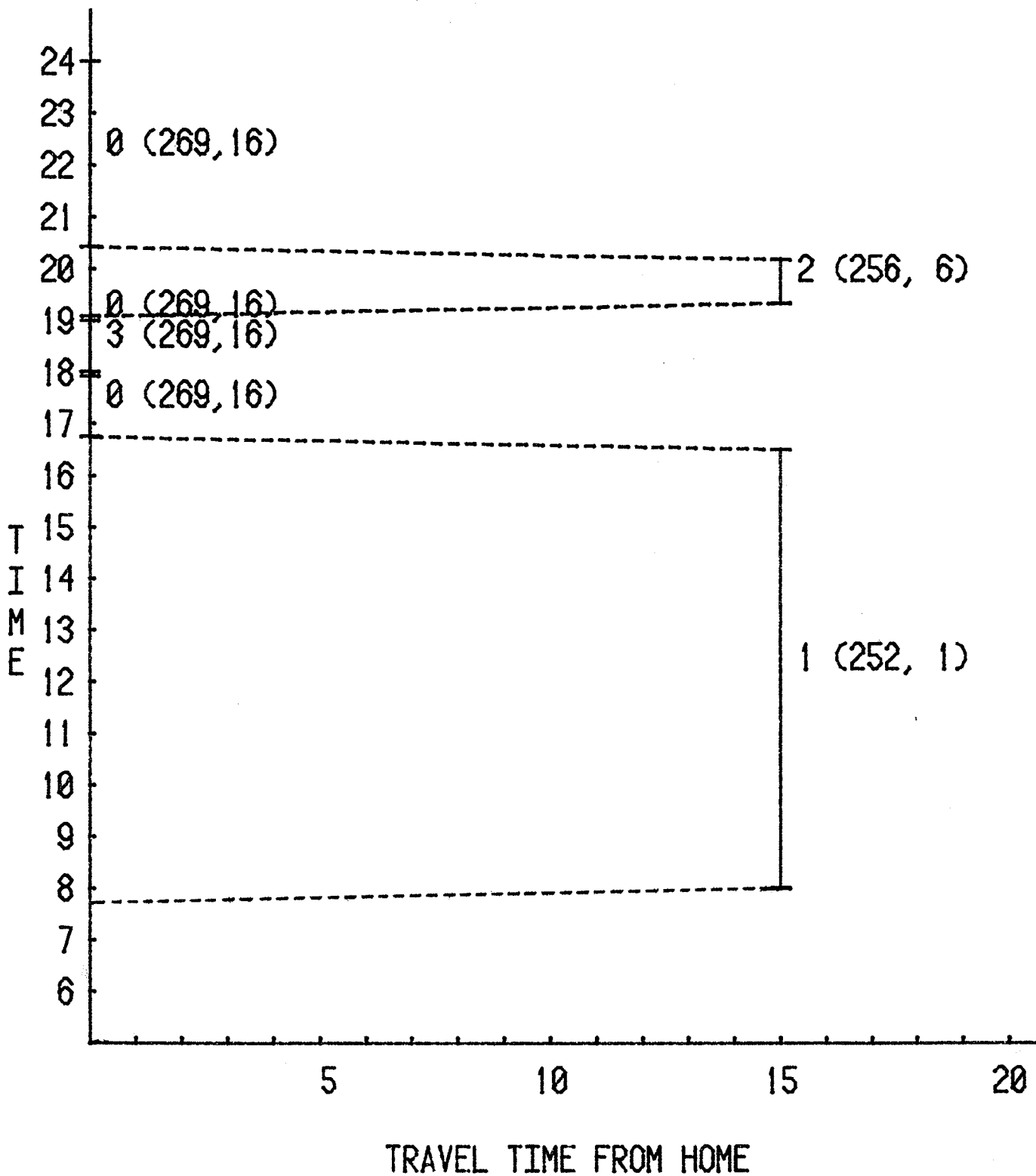


TRAVEL TIME FROM HOME

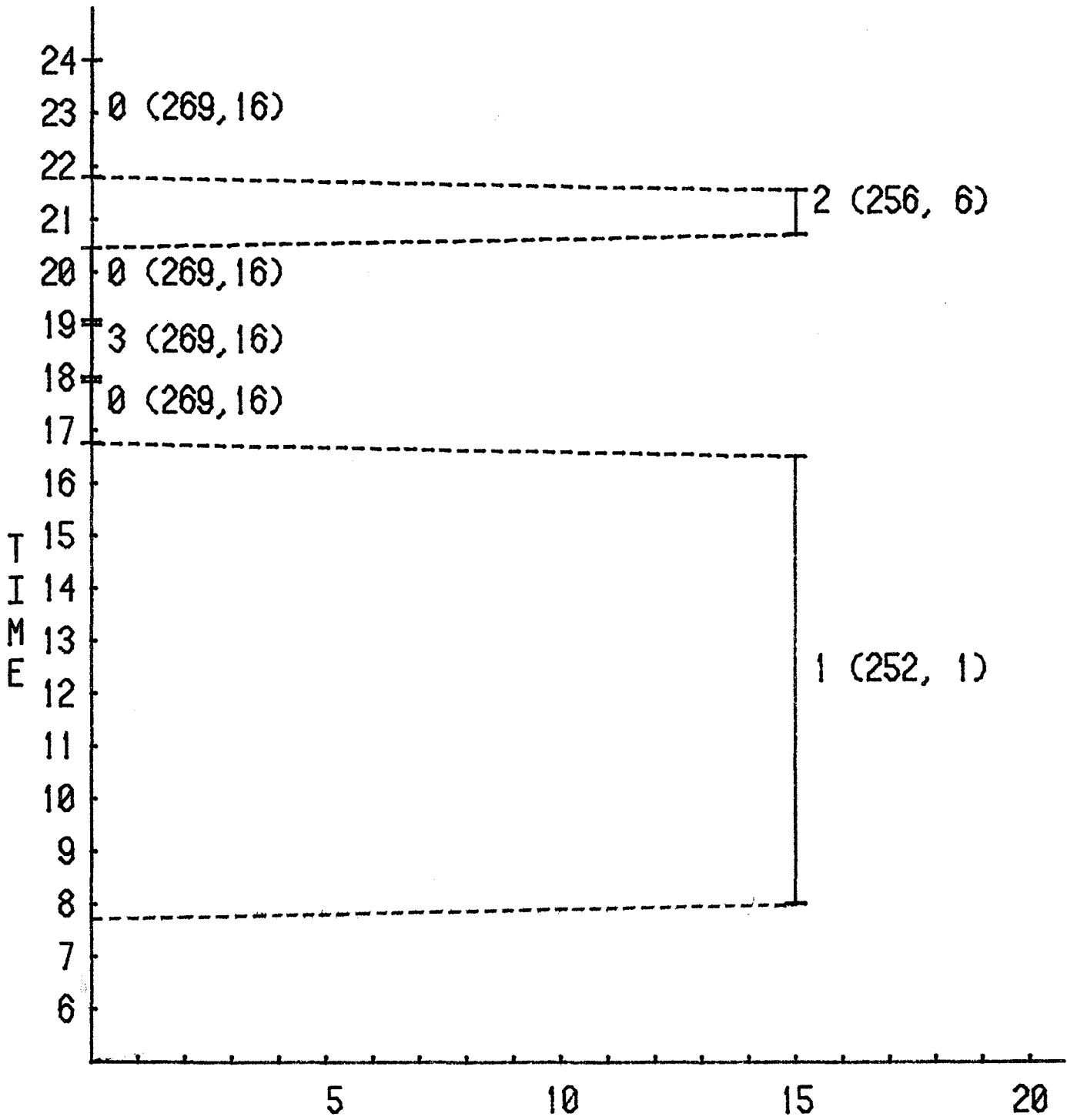
HOUSEHOLD: 92

PERSON: 1

8



HOUSEHOLD: 92 PERSON: 1 CHOSEN 10



TRAVEL TIME FROM HOME

HOUSEHOLD: 92

PERSON: 1

13