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GENERAL PLANNING CONSULTANT:

TECHNICAL MEMORANDUM 88.3.10

LOOK-UP TABLE FOR THE NEW
MODE-OF-ARRIVAL PROCEDURE

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Southern California Rapid Transit District

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1. SUMMARY

In the new mode-of-arrival (MOA) procedure developed by the General Planning Consultant (GPC), park-and-ride (PNR) trips in excess of the parking lot capacities at stations are diverted to other modes. The LOOKUP procedure herein described is the link in the diversion algorithm that calculates the diversion factors.

LOOKUP requires the input of PNR demands at each station and the station parking lot capacities. The latter are divided by the former to calculate the fraction of the demand that can be accommodated by the parking lots. LOOKUP then writes into a disk file a look-up file to be read by UMATRIX, which will perform the diversion.

2. DESCRIPTION

In the new MOA procedure, the step that immediately precedes LOOKUP is a UFMTR operation that writes an EBCDIC file to disk with the cumulative PNR demands to each rail transit station. This is done through UFMTR output files P (productions) and A (attractions), whose 'ddnames' are, respectively, A1 and A2. (A sample JCL set-up for this UFMTR operations is included in the technical memorandum describing the new MOA procedure.) Since the format of the UFMTR output is known, LOOKUP can easily retrieve the data from that file.

An example of a file generated by UFMTR is shown on Table 2-1. As can be seen, UFMTR actually writes into the file two sets of data, i.e., the PNR accumulation on each transit station for two periods: 8 to 9 am and 2 to 3 pm. The assumption here is that, by considering uniform arrivals and departures, parking accumulation will peak at the end of either the morning or the midday periods. LOOKUP compares the two numbers and chooses the largest.

LOOKUP reads next the station parking lot capacities which are in stream input. These capacities are used to calculate the fraction of the demand that can be handled by the parking lots. Since these fractions are to be read by UMATRIX '79, they must be given as integers; they are then multiplied by 1,000 to guarantee reasonable accuracy on the matrix manipulations.

Finally, LOOKUP writes to a disk file the above fractions for each station in UMATRIX look-up file format, which looks like the example shown below on Table 2-2.

Table 2-1
Table PKGDEMP generated by UFMTR

<u>Station #</u>	<u>Pkg Demand</u>	
	<u>8-9 am</u>	<u>2-3 pm</u>
1	5160	4629
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	4560	4156
12	1814	1651
13	1599	1458
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0

Table 2-2
FILE MOA.CORE3CA6.LOOKUP GENERATED BY LOOKUP

1	M	1000	STATION VS. PND FACTOR LOOKUP TABLE FOR UMATRIX								
8000	484	8001	1000	8003	1000	8004	1000	8006	1000	8007	1000
8008	1000	8009	1000	8010	1000	8011	1000	8012	219	8020	1000
8021	1000	8094	1000	8095	1000	8096	1000	8097	1000	8058	1000
8059	1000										

where:

- 1 = Table #
- M = Type of lookup table in UMATRIX (M = 'match-up')
- 1000 = value for misses (*)
- 8020 = rail station #
- 484 = (station capacity/PNR demand)*1000 (fraction given in thousandths) (*)

(*) Fractions were multiplied by 1000 to overcome the UMATRIX '79 limitation of only accepting integer cell values. In further UMATRIX operations, these factors must be divided by 1000.

2.1 FILE MANAGEMENT

LOOKUP takes advantage of the following UTPS input/output file handling subroutines:

NAME	CALLED BY	CALLS	PURPOSE OR FUNCTION	PARAMS
MAIN	NONE	SIGNON	MAIN PROGRAM (READPTH)	NONE
		UCHECK	1.READ ALL CONTROL CARDS	
		UFILES	2.VALIDITY CHECKS	
		UMSG	3.INITIALIZE ALL VALUES	
		SINOFF		
SIGNON	MAIN		UTPS PROGRAM - INITIALIZE JOB	
UCHECK	MAIN		UTPS PROGRAM - CHECK INPUTS	
UFILES	MAIN		UTPS PROGRAM - CHECK FILE DD	
UMSG	MAIN		UTPS PROGRAM - PRINT MESSAGE	
SIGNOFF	MAIN		UTPS PROGRAM - PRINT CPU TIME AND RETURN CODE	

2.2 DATA INPUT SEQUENCE AND NAMING CONVENTION

The following naming convention and input sequence is used in LOOKUP:

INPUT SEQUENCE

1. TITLE CARDS
2. PARAM
3. DATA
4. INPUT FILES

FILE NAME	DSNAME	DDNAME
PKGDEM	MRP.*.PKGDEMP	FT11F001
LOG	MRP.URD79.LOG	FT21F001
J9	ANY OUTPUT FILE NAME	FT19F001

2.3 PARAMETERS

LOOKUP was written to be as flexible as possible; hence, it allows some of the 'hard-coded' values to be changed by the user to meet specific needs:

K E Y W O R D S

	KEYWORD	TYPE	DEFAULT	MAX	VALUE OR PURPOSE
[&]	MAXSTA	I	19	140	MAX NUMBER OF STATIONS TO BE
[P]					READ
[A]					
[R]					
[A]					
[M]					
[&]	STATNS	I			LISTING OF RAIL STATIONS TO BE
[D]					READ
[A]					
[T]	PKGCAP	I			LISTING OF RAIL STATION PKG LOT
[A]					CAPACITIES
[]					

3. EXAMPLE OF JCL SET-UP

An example of in-stream compilation and run is shown below:

```
//LOOKUP EXEC FORTGCLG,REGION=1536K,CLASS=X
//*****
//***      COMPILE AND RUN LOOKUP
//*****
//*FORT.SYSPRINT DD SYSOUT=&CLASS
//FORT.SYSIN DD *
C
C PROGRAM MAIN - LOOKUP
C
C PROGRAM BY:  DR CHAUSHIE CHU & TSUTOMU IMADA
C              SCHIMPELER CORRADINO ASSOCIATES
C              GENERAL PLANNING CONSULTANT
C              SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
C
C PURPOSE:  THIS PROGRAM A) READS RAIL STATION NUMBERS, PKG DEMAND
C           VALUES FOR EACH STATION GENERATED BY UMATRIX, B) CALCULATE
C           THE FACTORS BY WHICH TRIP TABLES MUST BE MULTIPLIED
C           TO LIMIT PNR TRIPS TO STATION CAPACITIES, AND C) PRODUCES
C           A LOOKUP TABLE TO BE USED SUBSEQUENTLY IN UMATRIX
C           OPERATIONS.
C
C DATE:      MAY 20, 1988
C
C
C --- DIMENSION VARIABLES
C
C REAL*4     DVRFAC(140),PKGCAP(140),PKGDEM(140)
C INTEGER    DVRFAC(140),PKGCAP(140),PKGDEM(140)
C INTEGER    MAXSTA,N,STATNS(140),TRIPS9,TRIPS3
C
C --- VARIABLES FOR CALLING UCHECK, UFILE & UMSG SUBROUTINES
C
C INTEGER*4  FT(2)/2*0/,FN(2)/11,19/,
C *          PRESC,DISP,BUFNO,VOLSER(2),KERR,DSN(12),
C *          DEVICE,UCKDTE(2),PNTCTL/1/,BUFSZE
C INTEGER    FNM(2,5)/'PKGD','EM ',
C *          'J9 ',' '/
C
C SIGNON INITIATES PROGRAM
C
C CALL SIGNON(5,20,' LOOKUP ','30MAY88 ',CONT)
C
```

```

C   UCHECK, UFILE TO CHECK INPUT/OUTPUT FILES
C
      DO 132 I=1,2
      CALL UCHECK(FT(I),FN(I),PRESC,DISP,BUFSIZE,BUFNO,VOLSER,DSN,
*           DEVICE,UCKDTE,KERR)
      IF (KERR.EQ.0)GO TO 130
      CALL UMSG('(''0LOOKUP 0010 (ERROR): ERROR IN UCHECK CALL FOR ''
*''FILE '' ,2A4)',2,2,FNM(1,I))
      GO TO 132
130 CALL UFILES(FT(I),FN(I),PRESC,DISP,BUFSIZE,BUFNO,VOLSER,
*           DSN,DEVICE,UCKDTE,FNM(1,I),PNTCTL)
      PNTCTL=0
132 CONTINUE
C
C   --- DEFAULT NUMBER OF STATIONS TO BE READ
C
      MAXSTA=19
C
C   --- READ USER PARAMETERS:  MAXSTA, STATNS & PKGCAP
C
      NAMELIST /PARAM/ MAXSTA
      NAMELIST /DATA/ STATNS,PKGCAP
      REWIND 5
      READ(5,PARAM)
      READ(5,DATA)
C
C   --- READ PKG DEMAND VALUES FROM UMATRIX
C   (THESE ARE PKG ACCUM AT 9 AM AND 3 PM)
C
140 READ(11,142,END=148) N,TRIPS9,TRIPS3
142 FORMAT(I4,4X,2I6)
      IF(TRIPS9.GT.TRIPS3) GOTO 144
      PKGDEM(N)=TRIPS3
      GOTO 140
144 PKGDEM(N)=TRIPS9
      GOTO 140
148 CONTINUE
C
C   --- CALCULATE DIVERSION FACTORS
C   (FACTORS ARE GIVEN IN THOUSANDTHS)
C
40 DO 44 I=1,MAXSTA
      IF(PKGDEM(I).NE.0) GOTO 42
      DVRFAC(I)=1000
      GOTO 44
42 DVRFAC(I)=PKGCAP(I)*1000/PKGDEM(I)
      IF(DVRFAC(I).GT.1000) DVRFAC(I)=1000
44 CONTINUE
C

```

```

C
C   WRITE LOOK TABLE FOR UMATRIX
C   IT'S A MATCH-UP TABLE, WHICH ALTERNATES STATION NUMBER AND
C   DIVERSION FACTOR TO REDUCE PND TRIP TABLE
C   STATION NUMBERS ARE ENTERED IN &DATA
C   FACTORS ARE CALCULATED BY UMATRIX IN PREVIOUS STEPS
C
C
C   210  WRITE(6,218)
C   218  FORMAT(/,25X,'L O O K - U P T A B L E')
C   220  WRITE(6,228)
C   228  FORMAT(/,1X,'1---5---10---15---20---25---30---35---40---45---50'
C         2'---55---60---65---70--')
C   240  WRITE(6,248) ((STATNS(N),DVRFAC(N)),N=1,MAXSTA)
C   248  FORMAT(5X,'1',5X,'M',2X,'1000',7X,'STATION VS.PND FACTOR LOOKUP'
C         2 1X,'TABLE FOR UMATRIX',/,6(I6,F6.3),/,6(I6,F6.3),/,
C         3 6(I6,F6.3),/, (I6,F6.3))
C         2 1X,'TABLE FOR UMATRIX',/,6(2I6),/,6(2I6),/,
C         3 6(2I6),/, (2I6))
C   250  WRITE(6,228)
C   340  WRITE(19,248) ((STATNS(N),DVRFAC(N)),N=1,MAXSTA)
C   360  CONTINUE
C         RETURN
C         END
//LKED.SYSLIB DD DSN=SYS1.FORTG.LOADLIB,DISP=SHR
//          DD DSN=MRP.URD79.SUBRLIB,DISP=SHR
//LKED.SYSPRINT DD SYSOUT=&CLASS
//GO.FT05F001 DD DDNAME=SYSIN
//GO.FT08F001 DD DSN=&&FT08,DISP=(,PASS),UNIT=SYSDA,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=1600),
// SPACE=(TRK,(50,10),RLSE)
//*****
//* FT11 IS THE INPUT PARKING DEMAND FILE
//*****
//GO.FT11F001 DD DSN=MRPTXI.MOA.CNTL.PKGDEMP,DISP=SHR
//*****
//GO.FT19F001 DD UNIT=SYSDA,VOL=SER=PLAN02,SPACE=(TRK,(1,1)),
// DISP=(,CATLG),DSN=MRPTXI.MOA.CNTL.LOOKUP,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
//GO.FT20F001 DD UNIT=SYSDA,SPACE=(TRK,(1,1)),DISP=(,PASS),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
//GO.FT21F001 DD DSN=MRP.URD79.LOG,DISP=SHR
//GO.SYSIN DD *
LOOKUP TEST RUN
&PARAM MAXSTA=19 &END
&DATA STATNS=8000,8001,8003,8004,8006,8007,8008,3009,8010,8011,
      8012,8020,8021,8094,8095,8096,8097,8058,8059,
      PKGCAP=2500,0,0,0,0,0,0,0,0,0,1000,2450,2200,0,0,0,0,0,0 &END
/*

```