

## Natural Source

```

0010 * Module:      ZZMATCH                      (c) 2002 LEN Consulting LLC
0020 * System:      ZZUtils
0030 * Function:    Sequential Match
0040 * Author:      R. Zbrog
0050 * Date:        02/18/89
0060 *****
0070 *   Date      *   Name      * Summary of Changes
0080 *****
0090 * 09/11/01 * R. Zbrog * Demo files
0100 * 09/23/94 * R. Zbrog * Nat 2.2.5
0110 * 09/29/93 * R. Zbrog * Comments requesting custom code.
0120 * 12/16/92 * R. Zbrog * Trace
0130 *****
0140 *
0150 * Sample sequential-match program.
0160 *
0170 *   Matches an Adabas file and a work file - the Adabas file MUST be
0180 *   processed as the outer loop. Two sequential files may be matched by
0190 *   replacing the Adabas READ loop with a READ WORK loop (although no
0200 *   starting value may be specified for the READ WORK loop). Two Adabas
0210 *   files may not be matched; one of them must be converted to a work
0220 *   file (ie the inner loop MUST process a WORK file).
0230 *
0240 *   The view or record layout for the outer loop is called MSTR. The
0250 *   record layout for the inner loop is called TRAN.
0260 *
0270 *   The program uses the standard algorithm for a master file updated by
0280 *   a transaction file. The view or record layout for the outer loop
0290 *   is called MSTR; the record layout for the inner loop is called TRAN.
0300 *   The program detects record matches, extra MSTR records, and extra
0310 *   TRAN records.
0320 *
0330 *   The MSTR file must have a unique key and the TRAN file must be in
0340 *   the same sequence as MSTR. If both files have unique keys, a ratio
0350 *   of 1:1, then either file may be defined as MSTR or TRAN. If there
0360 *   is a 1:n ratio, then the file with the unique key must be defined as
0370 *   MSTR and the file with the non-unique key must be defined as TRAN.
0380 *
0390 *   Indeed, the files may not be true master and transaction files. It
0400 *   is the one-to-many ratio that defines which file will be treated as
0410 *   master and which will be treated as transaction.
0420 *
0430 *   If MSTR is an Adabas file, the program may be a good Prefetch
0440 *   candidate.
0450 *
0460 *   When customizing this program, review all comments for coding
0470 *   suggestions. For example, if a 1:1 ratio, optimize for this.
0480 *
0490 *   Lines marked with '<<<' contain mandatory changes.
0500 *   Lines marked with '>>>' contain optional code; use as appropriate.
0510 *   Remove optional code if it is not needed, as this will improve
0520 *   performance.
0530 *
0540 *   It is recommended that the #TRACE-ALL variable be set to TRUE until
0550 *   the user has reached an acceptable level of confidence in the
0560 *   program's use. This setting will cause an audit report to be
0570 *   produced, displaying all widows, orphans, and matches.

```

# ZZMATCH

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```
0580 *
0590 *   Software AG's EMPLOYEES demonstration file was used as the basis for
0600 *   the sample match in this program. To ensure unique keys, the MSTR
0610 *   file is defined as a WORK file. Refer to module ZZMATCHJ for JCL
0620 *   which includes sample MSTR and TRAN data.
0630 *
0640 *
0650 DEFINE DATA LOCAL
0660 1 MSTR (A72)          1 REDEFINE MSTR          /* Extract of EMPLOYEES demo file
0670 2 PERSONNEL-ID (A8)
0680 2 NAME (A20)
0690 2 FIRST-NAME (A20)
0700 2 PHONE (A15)
0710 2 DEPT (A6)
0720 2 LANG (A3)
0730 *
0740 *
0750 1 #TRAN (A40)        1 REDEFINE #TRAN
0760 2 NAME (A20)
0770 2 DEPT (A6)
0780 2 CUSTOMER (N5)
0790 2 COMMISSION (N7.2)
0800 *
0810 *
0820 1 #START                                /* >>> Optional FROM processing
0830 2 DEPT (A6)                               INIT <' '>
0840 2 NAMEW (A20)                             INIT <' '>
0850                                           1 REDEFINE #START
0860 2 #START-KEY (A26)
0870 *
0880 1 #END                                    /* >>> Optional THRU processing
0890 2 DEPT (A6)                               INIT <'99'>
0900 2 NAME (A20)                             INIT <'999999999'>
0910                                           1 REDEFINE #END
0920 2 #END-KEY(A26)
0930 *
0940 1 #MKEY                                    /* >>> Build key from non-contiguous fields
0950 2 DEPT (A6)
0960 2 NAME (A20)
0970                                           1 REDEFINE #MKEY
0980 2 #MSTR-KEY (A26)
0990 *
1000 1 #TKEY                                    /* >>> Build key from non-contiguous fields
1010 2 DEPT (A6)
1020 2 NAME (A20)
1030                                           1 REDEFINE #TKEY
1040 2 #TRAN-KEY (A26)
1050 *
1060 *
1070 1 #N                                        /* Counters
1080 2 CNTM (P7)                                /* Master
1090 2 EXTM (P7)                                /* Extra Master (Widow)
1100 2 CNTT (P7)                                /* Transaction
1110 2 EXTT (P7)                                /* Extra Trans (Orphan)
1120 2 MCHT (P7)                                /* Matched transactions
1130 *
1140 1 #LOGICALS
1150 2 #MSTR-MATCHED (L)
1160 2 #TRAN-NEEDED (L)                        INIT <TRUE>
```

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```
1170 2 #EOF (L) INIT <FALSE>
1180 /*
1190 2 #TRACE-ALL (L) INIT <TRUE> /* >>>
1200 2 #TRACE-MSTR (L) INIT <FALSE> /* >>>
1210 2 #TRACE-TRAN (L) INIT <FALSE> /* >>>
1220 2 #TRACE-MISC (L) INIT <FALSE> /* >>>
1230 *
1240 1 #MISC
1250 2 #DATE (A8) INIT < *DATU> /* Constant for report
1260 2 #TIME (A5) INIT < *TIMX> /* Constant for report
1270 *
1280 2 #NAME (A20)
1290 END-DEFINE
1300 *
1310 FORMAT (01) PS=60 LS=132
1320 */
1330 *
1340 READ WORK 1 MSTR /* >>> READ MSTR BY DEPT-PERSON
1350 /* FROM #START-KEY /* >>>
1360 ASSIGN #MKEY.DEPT = MSTR.DEPT /* >>> Build a
1370 ASSIGN #MKEY.NAME = MSTR.NAME /* >>> contiguous key
1380 IF #MSTR-KEY > #END-KEY /* >>> Optional 'thru'
1390 THEN
1400 ESCAPE BOTTOM
1410 END-IF
1420 ADD 1 TO #N.CNTM
1430 ASSIGN #MSTR-MATCHED = FALSE /* Not yet matched
1440 *
1450 *
1460 COMPRESS MSTR.NAME /* <<<
1470 ' , '
1480 INTO #NAME LEAVING NO SPACE
1490 COMPRESS #NAME /* <<<
1500 MSTR.FIRST-NAME
1510 INTO #NAME
1520 *
1530 *
1540 RPT.
1550 REPEAT
1560 IF #TRAN-NEEDED
1570 THEN
1580 TR.
1590 READ WORK 2 ONCE #TRAN
1600 AT END OF FILE
1610 ASSIGN #EOF = TRUE
1620 END-ENDFILE
1630 IF #EOF
1640 THEN
1650 MOVE ALL H'FF' TO #TRAN-KEY
1660 ASSIGN #TRAN-NEEDED = FALSE
1670 ELSE
1680 ASSIGN #TKEY.DEPT = #TRAN.DEPT /* >>> Build a
1690 ASSIGN #TKEY.NAME = #TRAN.NAME /* >>> contiguous key
1700 ADD 1 TO #N.CNTT
1710 END-IF
1720 END-IF
1730 *
1740 DECIDE FOR FIRST CONDITION
1750 WHEN #MSTR-KEY < #TRAN-KEY /* Must get next master
```

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```
1760 IF NOT #MSTR-MATCHED /* Previously matched
1770 THEN /* Process an unmatched master
1780 IF #TRACE-ALL /* >>>
1790 OR #TRACE-MSTR
1800 THEN
1810 WRITE (01)
1820 MSTR.DEPT
1830 2X #NAME
1840 2X MSTR.PHONE
1850 2X MSTR.PERSONNEL-ID
1860 2X MSTR.LANG
1870 88T #N.CNTM (EM=Z,ZZZ,ZZ9)
1880 110T 'Extra Master' /* Widow
1890 END-IF
1900 /*
1910 /* <<< Code 'widow' logic here. <<<
1920 /*
1930 ADD 1 TO #N.EXTM
1940 END-IF
1950 ASSIGN #TRAN-NEEDED = FALSE /* Apply to next master
1960 ESCAPE BOTTOM (RPT.) /* Process next master
1970 WHEN #MSTR-KEY = #TRAN-KEY /* Process a match
1980 IF #TRACE-ALL /* >>>
1990 OR #TRACE-MSTR
2000 OR #TRACE-TRAN
2010 THEN
2020 WRITE (01)
2030 MSTR.DEPT
2040 2X #NAME
2050 2X MSTR.PHONE
2060 2X MSTR.PERSONNEL-ID
2070 2X MSTR.LANG
2080 64T #TRAN.CUSTOMER
2090 74T #TRAN.COMMISSION (EM=Z,ZZZ,ZZ9.99)
2100 88T #N.CNTM (EM=Z,ZZZ,ZZ9)
2110 99T #N.CNTT (EM=Z,ZZZ,ZZ9)
2120 110T 'Matched MSTR/TRAN'
2130 END-IF
2140 ADD 1 TO #N.MCHT
2150 /*
2160 /* <<< Code 'match' logic here. <<<
2170 /*
2180 ASSIGN #MSTR-MATCHED = TRUE
2190 ASSIGN #TRAN-NEEDED = TRUE /* Try next transaction
2200 * >>> ESCAPE BOTTOM (RPT.) /* Next master; force 1:1 ratio
2210 WHEN #MSTR-KEY > #TRAN-KEY /* Process an unmatched tran
2220 IF #TRACE-ALL /* >>>
2230 OR #TRACE-TRAN
2240 THEN
2250 WRITE (01)
2260 #TRAN.DEPT
2270 2X #TRAN.NAME
2280 64T #TRAN.CUSTOMER
2290 74T #TRAN.COMMISSION (EM=Z,ZZZ,ZZ9.99)
2300 99T #N.CNTT (EM=Z,ZZZ,ZZ9)
2310 110T 'Extra Transaction' /* Orphan
2320 END-IF
2330 ADD 1 TO #N.EXTT
2340 PERFORM ORPHAN
```

# ZZMATCH

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```
2350          ASSIGN #TRAN-NEEDED = TRUE /* Try next transaction
2360      WHEN NONE
2370          IGNORE
2380      END-DECIDE
2390      END-REPEAT
2400 END-WORK          /* >>> END-READ
2410 *
2420 IF #TRAN-NEEDED /* No waiting transaction
2430 OR #EOF          /* Transaction end of file
2440 THEN
2450     IGNORE
2460 ELSE
2470     IF #TRACE-ALL /* >>>
2480     OR #TRACE-TRAN
2490     THEN
2500         WRITE (01)
2510             #TRAN.DEPT
2520             2X #TRAN.NAME
2530             64T #TRAN.CUSTOMER
2540             74T #TRAN.COMMISSION (EM=Z,ZZZ,ZZ9.99)
2550             99T #N.CNTT (EM=Z,ZZZ,ZZ9)
2560             110T 'Trailing TRAN' /* Orphan
2570     END-IF
2580     ADD 1 TO #N.EXTT
2590     PERFORM ORPHAN
2600 END-IF
2610 *
2620 REPEAT WHILE NOT #EOF /* Process extra TRAN records
2630     READ WORK 2 ONCE #TRAN /* Same file number as (TR.)
2640     AT END OF FILE
2650     ESCAPE BOTTOM
2660     END-ENDFILE
2670     ADD 1 TO #N.CNTT
2680     IF #TRACE-ALL /* >>>
2690     OR #TRACE-TRAN
2700     THEN
2710         WRITE (01)
2720             #TRAN.DEPT
2730             2X #TRAN.NAME
2740             64T #TRAN.CUSTOMER
2750             74T #TRAN.COMMISSION (EM=Z,ZZZ,ZZ9.99)
2760             99T #N.CNTT (EM=Z,ZZZ,ZZ9)
2770             110T 'Extra TRAN > Last MSTR' /* Orphan
2780     END-IF
2790     ADD 1 TO #N.EXTT
2800     PERFORM ORPHAN
2810 END-REPEAT
2820 *
2830 *
2840 NEWPAGE (01)
2850 WRITE (01)
2860     // #N.CNTM (EM=Z,ZZZ,ZZ9) 'Master Records Read'
2870     // #N.CNTT (EM=Z,ZZZ,ZZ9) 'Transaction Records Read'
2880     /// #N.EXTM (EM=Z,ZZZ,ZZ9) 'Unmatched Masters (Widows)'
2890     // #N.EXTT (EM=Z,ZZZ,ZZ9) 'Unmatched Transactions (Orphans)'
2900     /// #N.MCHT (EM=Z,ZZZ,ZZ9) 'Matched Transactions'
2910 *
2920 *
2930 WRITE (01) TITLE LEFT
```

## ZZMATCH

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```
2940          *program (cd=bl)
2950          10T 'LEN Consulting LLC'
2960          118T #DATE
2970          #TIME
2980          / 10T 'Natural Utilities'
2990          122t 'ZZUtils v2' (yei)
3000          / 10T 'Sample Sequential Match Program' (bli)
3010          120T 'Page:' *PAGE-NUMBER (01) (EM=ZZ,ZZ9)
3020          //      'Dept'                      /* <<<
3030          9T 'Name'                          /* <<<
3040          31T 'Phone'                       /* <<<
3050          48T 'Personnel'                  /* <<<
3060          58T 'Lang'                       /* <<<
3070          64T '  Cust'                     /* <<<
3080          74T '  Commission'              /* <<<
3090          88T '  Master'                  /* <<<
3100          99T '  Trans'                   /* <<<
3110          110T 'Message'                   /* <<<
3120          /
3130          *
3140          *
3150          DEFINE SUBROUTINE ORPHAN
3160          *
3170          * <<< Code 'orphan' logic here. <<<
3180          *
3190          ESCAPE ROUTINE                    /* <<< Replace with 'orphan' logic
3200          END-SUBROUTINE
3210          END
```

# ZZMATCH

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## MVS JCL

```
0010 //jobname JOB (acct),'ZZMATCH SAMPLE',CLASS=a,MSGCLASS=x,
0020 //          MSGLEVEL=(1,1),NOTIFY=userid,REGION=0M
0030 //*                               (c) 2002 LEN Consulting LLC
0040 //MATCH      EXEC NATURAL
0050 //CMPRINT    DD SYSOUT=*
0060 //CMWKF01    DD *                               MSTR
0070 00000050BOSTON          FRANK          202 555 1212  ACCTNGENG
0080 00000060SMITH          JOHN           714 555 9876  ENTMNTGER
0090 00000070SMYTHE         JON            562 555 6543  ENTMNTGER
0100 00000080GERSTNER      LOU            204 555 2345  SALE01FRE
0110 00000090SMITH         SAM            415 555 6382  SALE01ENG
0120 00000001CAIN          ABLE           800 555 1234  TECH01ENG
0130 /*
0140 //CMWKF02    DD *                               TRAN
0150 SMITH              ENTMNT072900000025000
0160 SMYTHE             ENTMNT002840000059900
0170 GERSTNER          SALE01001850000025000
0180 GERSTNER          SALE01029741000000000
0190 GERSTNER          SALE01032970015000000
0200 GERSTNER          SALE01041268007500000
0210 SMITH             SALE01000397010000000
0220 CAIN              TECH01013430001000000
0230 SMITH             TECH01270320000855000
0240 THOMPSON          TECH01007190007850000
0250 THOMPSON          TECH01249000004567000
0260 ZILDJAN           TECH13000200000125000
0270 /*
0280 //CMSYNIN      DD *
0290 LOGON ZZUTIL
0300 ZZMATCH
0310 FIN
0320 /*
0330 //
```

Sample Report

ZZMATCH LEN Consulting LLC  
 Natural Utilities  
 Sample Sequential Match Program

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 ZZUtils v2  
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Dept	Name	Phone	Personnel	Lang	Cust	Commission	Master	Trans	Message
ACCTNG	BOSTON, FRANK	202 555 1212	00000050	ENG			1		Extra Master
ENTMNT	SMITH, JOHN	714 555 9876	00000060	GER	7290	250.00	2	1	Matched MSTR/TRAN
ENTMNT	SMYTHE, JON	562 555 6543	00000070	GER	284	599.00	3	2	Matched MSTR/TRAN
SALE01	GERSTNER, LOU	204 555 2345	00000080	FRE	185	250.00	4	3	Matched MSTR/TRAN
SALE01	GERSTNER, LOU	204 555 2345	00000080	FRE	2974	1,000,000.00	4	4	Matched MSTR/TRAN
SALE01	GERSTNER, LOU	204 555 2345	00000080	FRE	3297	15,000.00	4	5	Matched MSTR/TRAN
SALE01	GERSTNER, LOU	204 555 2345	00000080	FRE	4126	8,007,500.00	4	6	Matched MSTR/TRAN
SALE01	SMITH, SAM	415 555 6382	00000090	ENG	39	7,010,000.00	5	7	Matched MSTR/TRAN
TECH01	CAIN, ABLE	800 555 1234	00000001	ENG	1343	1,000.00	6	8	Matched MSTR/TRAN
TECH01	SMITH				27032	855.00		9	Trailing TRAN
TECH01	THOMPSON				719	7,850.00		10	Extra TRAN > Last MSTR
TECH01	THOMPSON				24900	4,567.00		11	Extra TRAN > Last MSTR
TECH13	ZILDJAN				20	125.00		12	Extra TRAN > Last MSTR

ZZMATCH LEN Consulting LLC  
 Natural Utilities  
 Sample Sequential Match Program

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Dept	Name	Phone	Personnel	Lang	Cust	Commission	Master	Trans	Message
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6 Master Records Read

12 Transaction Records Read

1 Unmatched Masters (Widows)

4 Unmatched Transactions (Orphans)

8 Matched Transactions

