Some aspects of the implementation of a relational data base sublanguage

Lim, Richard Thuan Chan

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LLL           IIIIIII     SSSSSSSS   TTTTTTTTTTT    IIIIIII    NNNN     NNN   GGGGGGGG
LLL           IIIIIII   SSSS   SSS  TTTTTTTTTTT    IIIIIII    NNNNN    NNN  GGGGGGGGGG
LLL             III     SSS             TTT          III      NNNNNN   NNN  GGG
LLL             III      SSSSSSSS       TTT          III      NNN NNN NNN  GGG  GGGGGG
LLL             III            SSS     TTT          III      NNN  NNNNNN  GGG    GG
LLLLLLLLLL    IIIIIII   SSS    SSSS     TTT        IIIIIII    NNN   NNNNN  GGGGGGGGG
LLLLLLLLLL    IIIIIII     SSSSSSSS       TTT        IIIIIII    NNN    NNNN   GGGGGGG

 OOOOOOOO    FFFFFFFFFF                TTTTTTTTTTT   HHH    HHH   EEEEEEEEEE
OOO    OOO   FFFFFFFFFF                TTTTTTTTTTT   HHH    HHH   EEEEEEEEEE
OOO    OOO   FFF                           TTT       HHH    HHH   EEE
OOO    OOO   FFFFFFF                       TTT       HHHHHHHHHH   EEEEEE
OOO    OOO   FFFFFFF                       TTT       HHHHHHHHHH   EEE
OOO    OOO   FFF                           TTT       HHH    HHH   EEEEEEEEEE
 OOOOOOOO    FFF                           TTT       HHH    HHH   EEEEEEEEEE

TTTTTTTTTTT   RRRRRRRR      AAAAAA     NNNN    NNN   SSSSSSSS    LLL          AAAAAA     TTTTTTTTTTT   OOOOOOOO    RRRRRRRR
TTTTTTTTTTT   RRRRRRRRR    AAAAAAAA    NNNNN   NNN  SSSS   SSS   LLL         AAAAAAAA    TTTTTTTTTTT  OOO    OOO   RRRRRRRRR
    TTT       RRR   RRR   AAA    AAA   NNNNNN  NNN  SSS           LLL        AAA    AAA       TTT      OOO    OOO   RRR   RRR
    TTT       RRRRRRRRR   AAAAAAAAAA   NNN NNN NNN   SSSSSSSS    LLL        AAAAAAAAAA      TTT      OOO    OOO   RRRRRRRRR
    TTT       RRRRRRRR    AAAAAAAAAA   NNN  NNNNNN         SSS   LLL        AAAAAAAAAA      TTT      OOO    OOO   RRRRRRRR
    TTT       RRR   RRR   AAA    AAA   NNN   NNNNN  SSS   SSSS   LLLLLLLLLL AAA    AAA       TTT      OOO    OOO   RRR   RRR
    TTT       RRR    RRR  AAA    AAA   NNN    NNNN   SSSSSSSS    LLLLLLLLLL AAA    AAA       TTT       OOOOOOOO   RRR    RRR
```

```
MMM      MMM      AAAAAA      IIIIIII     NNNN     NNN    PPPPPPPPP     RRRRRRRR      GGGGGGGG
MMMM    MMMM     AAAAAAAA     IIIIIII     NNNNN    NNN    PPPPPPPPPP    RRRRRRRRR    GGGGGGGGGG
MMMMM  MMMMM    AAA    AAA      III       NNNNNN   NNN    PPP     PPP   RRR    RRR   GGG
MMM MMM MMM    AAAAAAAAAA      III       NNN NNN NNN    PPPPPPPPPP    RRRRRRRRR    GGG   GGGGGG
MMM  M  MMM    AAAAAAAAAA      III       NNN  NNNNNN    PPPPPPPPP     RRRRRRRR     GGG     GG
MMM     MMM    AAA    AAA     IIIIIII    NNN   NNNNN    PPP           RRR   RRR    GGGGGGGGG
MMM     MMM    AAA    AAA     IIIIIII    NNN    NNNN    PPP           RRR    RRR    GGGGGGG
```

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

DIAG

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
   EBCDIC
   CHAR60
NOMACRO
   SOURCE2
NOMACDCK
   COMP
   SOURCE
   ATR
   XREF
NOEXTREF
NOLIST
NOLOAD
   DECK
   FLAGW
   STMT
   SIZE=01P
   LINECNT=060
   OPT=01
   SORMGIN=(001,072)
NOEXTDIC
   NEST
   OPLIST
   SYNCHKS
   DIAG
```

```
*OPTIONS IN EFFECT*   EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,NOLOAD,
*OPTIONS IN EFFECT*   DECK,FLAGW,STMT,SIZE=01P,LINECNT=060,OPT=01,SORMGIN=(001,072),NOEXTDIC,
*OPTIONS IN EFFECT*   NEST,OPLIST,SYNCHKS,DIAG
```

```
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  1                1.000  MAINPRG : PROCEDURE OPTIONS(MAIN);
                   2.000
                   3.000       /* ***************************************************************
                   4.000          ***************************************************************
                   5.000          *              INITIALIZATION  OF  FPL  STATEMENTS              *
                   6.000          *                                                               *
                   7.000          *                                FOR                            *
                   8.000          *                                                               *
                   9.000          *                         THE  SYNTAX  ANALYZER                 *
                  10.000          ***************************************************************
                  11.000          ***************************************************************
                  12.000       */
  2      1         13.000            DCL 1 FPL(-4:220) EXTERNAL,
                  14.000                 2 SYM_ON_STK BIT(6)
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                  24.000                                      '001011'B,
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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST
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STMT LEVEL NEST

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STMT LEVEL NEST

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Dataset Limited

STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST

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                    1365.000                                '01'B,
                    1366.000                                '00'B,
                    1367.000                                '00'B,
                    1368.000                                '00'B,
                    1369.000                                '00'B);
                    1370.000
  3     1           1371.000          CALL PROG;
                    1372.000
  4     1           1373.000    END;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
2	DISCARD_BY	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(2),BIT
2	FPL	(-4:220)STATIC,EXTERNAL,STRUCTURE,STRUCTURE
2	INPUT_SYM	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(6),BIT
1 *********	MAINPRG	ENTRY,BINARY,FIXED(15,0)
	PROG	EXTERNAL,ENTRY,DECIMAL,FLOAT(SINGLE) 3
2	REDUCED_BY	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(3),BIT
2	SCAN	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(2),BIT
2	SEM_ROUT	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(6),BIT
2	SYM_ON_STK	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(6),BIT

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
2	FPL	704

STORAGE REQUIREMENTS.

THE STORAGE AREA FOR THE PROCEDURE LABELLED MAINPRG IS 184 BYTES LONG.

THE PROGRAM CSECT IS NAMED MAINPRG AND IS 88 BYTES LONG.

THE STATIC CSECT IS NAMED MAINPRGA AND IS 75 BYTES LONG.

STATISTICS SOURCE RECORDS = 1373,PROG TEXT STMNTS = 4,OBJECT BYTES = 88

COMPILER DIAGNOSTICS.

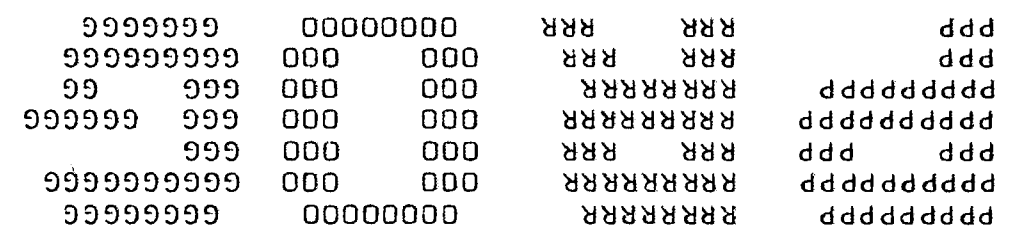
WARNINGS.

IEM0764I ONE OR MORE FIXED BINARY ITEMS OF PRECISION 15 OR LESS HAVE BEEN GIVEN HALFWORD STORAGE. THEY ARE FLAGGED '*********' IN THE XREF/ATR LIST.

END OF DIAGNOSTICS.

COMPILE TIME 19.36 SECS

ELAPSED TIME 7.61 MINS



PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

DIAG

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
  EBCDIC
  CHAR60
NOMACRO
  SOURCE2
NOMACDCK
  COMP
  SOURCE
  ATR
  XREF
NOEXTREF
NOLIST
NOLOAD
  DECK
  FLAGW
  STMT
  SIZE=01P
  LINECNT=060
  OPT=01
  SORMGIN=(001,072)
NOEXTDIC
  NEST
  OPLIST
  SYNCHKS
  DIAG
```

```
*OPTIONS IN EFFECT*   EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,NOLOAD,
*OPTIONS IN EFFECT*   DECK,FLAGW,STMT,SIZE=01P,LINECNT=060,OPT=01,SORMGIN=(001,072),NOEXTDIC,
*OPTIONS IN EFFECT*   NEST,OPLIST,SYNCHKS,DIAG
```

```
STMT LEVEL NEST
  1                1.000  PROG     : PROCEDURE;
                   2.000
                   3.000       /* ********************************************************************
                   4.000          ********************************************************************
                   5.000          *              INITIALIZATION  OF  FPL  STATEMENTS                 *
                   6.000          *                                                                  *
                   7.000          *                                 FOR                              *
                   8.000          *                                                                  *
                   9.000          *                         THE  SYNTAX  ANALYZER                    *
                  10.000          ********************************************************************
                  11.000          ********************************************************************
                  12.000       */
  2      1         13.000            DCL 1 FPL_LAB(-4:220) EXTERNAL,
                  14.000                 2 SUCCESS BIT(8)
                  15.000                           INITIAL('11001111'B,
                  16.000                                   '11001010'B,
                  17.000                                   '11001000'B,
                  18.000                                   '10111111'B,
                  19.000                                   '11000100'B,
                  20.000                                   'CCCC0010'B,
                  21.000                                   '00001111'B,
                  22.000                                   '10001001'B,
                  23.000                                   '10010010'B,
                  24.000                                   '00000000'B,
                  25.000                                   'C0000001'B,
                  26.000                                   '10100010'B,
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                  29.000                                   '01101110'B,
                  30.000                                   '01111010'B,
                  31.000                                   'C0001111'B,
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                  50.000                                   'C0100000'B,
                  51.000                                   '00101000'B,
                  52.000                                   '00101000'B,
                  53.000                                   '00100010'B,
                  54.000                                   '00101001'B,
                  55.000                                   '00111001'B,
                  56.000                                   '00100110'B,
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STMT LEVEL NEST

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          65.000                    '00101111'B,
          66.000                    'C0110011'B,
          67.000                    '00110001'B,
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          69.000                    '00110011'B,
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          72.000                    '00111010'B,
          73.000                    'C0111000'B,
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          78.000                    '00111001'B,
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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST

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STMT LEVEL NEST
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STMT LEVEL NEST

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                361.000                 '00'B,
                362.000                 '00'B,
                363.000                 '00'B,
                364.000                 '00'B,
                365.000                 '01'B,
                366.000                 '01'B,
                367.000                 '01'B,
                368.000                 '00'B,
                369.000                 '00'B,
                370.000                 '01'B,
                371.000                 '00'B,
                372.000                 '01'B,
                373.000                 '00'B,
                374.000                 '00'B,
                375.000                 '00'B,
                376.000                 '01'B,
                377.000                 '00'B,
                378.000                 '01'B,
                379.000                 '00'B,
                380.000                 '00'B,
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STMT LEVEL NEST
                    381.000                    '01'B,
                    382.000                    '01'B,
                    383.000                    '00'B,
                    384.000                    '00'B,
                    385.000                    '00'B,
                    386.000                    '00'B,
                    387.000                    '01'B,
                    388.000                    '01'B,
                    389.000                    '00'B,
                    390.000                    '01'B,
                    391.000                    '01'B,
                    392.000                    '01'B,
                    393.000                    '00'B,
                    394.000                    '00'B,
                    395.000                    '01'B,
                    396.000                    '00'B,
                    397.000                    '01'B,
                    398.000                    '00'B,
                    399.000                    '01'B,
                    400.000                    '01'B,
                    401.000                    '00'B,
                    402.000                    '00'B,
                    403.000                    '00'B,
                    404.000                    '00'B,
                    405.000                    '00'B,
                    406.000                    '10'B,
                    407.000                    '10'B,
                    408.000                    '00'B,
                    409.000                    '00'B,
                    410.000                    '10'B,
                    411.000                    '00'B,
                    412.000                    '10'B,
                    413.000                    '10'B,
                    414.000                    '10'B,
                    415.000                    '00'B,
                    416.000                    '00'B,
                    417.000                    '00'B,
                    418.000                    '00'B,
                    419.000                    '10'B,
                    420.000                    '10'B,
                    421.000                    '00'B,
                    422.000                    '00'B,
                    423.000                    '00'B,
                    424.000                    '00'B,
                    425.000                    '00'B,
                    426.000                    '00'B,
                    427.000                    '00'B,
                    428.000                    '10'B,
                    429.000                    '00'B,
                    430.000                    '00'B,
                    431.000                    '00'B,
                    432.000                    '00'B,
                    433.000                    '00'B,
                    434.000                    '00'B,
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STMT LEVEL NEST
               435.000                 '00'B,
               436.000                 '00'B,
               437.000                 '00'B,
               438.000                 '00'B,
               439.000                 '00'B,
               440.000                 '00'B,
               441.000                 '00'B,
               442.000                 '00'B,
               443.000                 '00'B,
               444.000                 '00'B,
               445.000                 '00'B,
               446.000                 '00'B,
               447.000                 '00'B,
               448.000                 '00'B,
               449.000                 '00'B,
               450.000                 '00'B,
               451.000                 '00'B,
               452.000                 '00'B,
               453.000                 '00'B,
               454.000                 '10'B,
               455.000                 '10'B,
               456.000                 '01'B,
               457.000                 '00'B,
               458.000                 '01'B,
               459.000                 '00'B,
               460.000                 '00'B,
               461.000                 '00'B,
               462.000                 '00'B,
               463.000                 '00'B,
               464.000                 '00'B,
               465.000                 '00'B),
               466.000        2 ERROR_MESS BIT(6)
               467.000                 INITIAL('000000'B,
               468.000                         '000000'B,
               469.000                         '000000'B,
               470.000                         '000000'B,
               471.000                         '000000'B,
               472.000                         '000000'B,
               473.000                         '000000'B,
               474.000                         '000000'B,
               475.000                         '000000'B,
               476.000                         '000000'B,
               477.000                         '000000'B,
               478.000                         '000001'B,
               479.000                         '000000'B,
               480.000                         '000000'B,
               481.000                         '000000'B,
               482.000                         '000000'B,
               483.000                         '000000'B,
               484.000                         '000000'B,
               485.000                         '000010'B,
               486.000                         '000000'B,
               487.000                         '000000'B,
               488.000                         '000011'B,
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STMT LEVEL NEST
              489.000                              '000100'B,
              490.000                              '000000'B,
              491.000                              '000000'B,
              492.000                              '000101'B,
              493.000                              '000000'B,
              494.000                              '000000'B,
              495.000                              '000000'B,
              496.000                              '000000'B,
              497.000                              '000000'B,
              498.000                              '000000'B,
              499.000                              '000000'B,
              500.000                              '000000'B,
              501.000                              '000000'B,
              502.000                              '000110'B,
              503.000                              '000000'B,
              504.000                              '000000'B,
              505.000                              '000000'B,
              506.000                              '000000'B,
              507.000                              '000000'B,
              508.000                              '000111'B,
              509.000                              '000000'B,
              510.000                              '000000'B,
              511.000                              '001000'B,
              512.000                              '001001'B,
              513.000                              '001010'B,
              514.000                              '000000'B,
              515.000                              '001010'B,
              516.000                              '001011'B,
              517.000                              '001100'B,
              518.000                              '000000'B,
              519.000                              '001101'B,
              520.000                              '000000'B,
              521.000                              '001101'B,
              522.000                              '001110'B,
              523.000                              '001100'B,
              524.000                              '000000'B,
              525.000                              '000000'B,
              526.000                              '000000'B,
              527.000                              '001111'B,
              528.000                              '010000'B,
              529.000                              '000000'B,
              530.000                              '000000'B,
              531.000                              '000111'B,
              532.000                              '000000'B,
              533.000                              '000111'B,
              534.000                              '010000'B,
              535.000                              '000000'B,
              536.000                              '000000'B,
              537.000                              '000000'B,
              538.000                              '000000'B,
              539.000                              '000000'B,
              540.000                              '000000'B,
              541.000                              '000000'B,
              542.000                              '010001'B,
```

```
STMT LEVEL NEST

                543.000                          '010010'B,
                544.000                          '010011'B,
                545.000                          '010100'B,
                546.000                          '000000'B,
                547.000                          '000000'B,
                548.000                          '000000'B,
                549.000                          '010101'B,
                550.000                          '010011'B,
                551.000                          '010110'B,
                552.000                          '010111'B,
                553.000                          '010111'B,
                554.000                          '010111'B,
                555.000                          '010111'B,
                556.000                          '011000'B,
                557.000                          '011000'B,
                558.000                          '001011'B,
                559.000                          '001100'B,
                560.000                          '000000'B,
                561.000                          '001101'B,
                562.000                          '000000'B,
                563.000                          '001101'B,
                564.000                          '001110'B,
                565.000                          '001100'B,
                566.000                          '000000'B,
                567.000                          '000000'B,
                568.000                          '000000'B,
                569.000                          '000000'B,
                570.000                          '000000'B,
                571.000                          '000000'B,
                572.000                          '000000'B,
                573.000                          '000000'B,
                574.000                          '000000'B,
                575.000                          '000000'B,
                576.000                          '000000'B,
                577.000                          '001111'B,
                578.000                          '011011'B,
                579.000                          '000000'B,
                580.000                          '000000'B,
                581.000                          '000000'B,
                582.000                          '011100'B,
                583.000                          '000000'B,
                584.000                          '000000'B,
                585.000                          '000111'B,
                586.000                          '010000'B,
                587.000                          '000000'B,
                588.000                          '000000'B,
                589.000                          '000000'B,
                590.000                          '000000'B,
                591.000                          '001111'B,
                592.000                          '000111'B,
                593.000                          '011101'B,
                594.000                          '000000'B,
                595.000                          '000000'B,
                596.000                          '011110'B,
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STMT LEVEL NEST

        597.000                 '000000'B,
        598.000                 '011111'B,
        599.000                 '000000'B,
        600.000                 '000000'B,
        601.000                 '000000'B,
        602.000                 '100000'B,
        603.000                 '000000'B,
        604.000                 '100000'B,
        605.000                 '000000'B,
        606.000                 '000000'B,
        607.000                 '100001'B,
        608.000                 '100010'B,
        609.000                 '000000'B,
        610.000                 '000000'B,
        611.000                 '000000'B,
        612.000                 '000000'B,
        613.000                 '100000'B,
        614.000                 '100000'B,
        615.000                 '000000'B,
        616.000                 '100000'B,
        617.000                 '100011'B,
        618.000                 '100100'B,
        619.000                 '000000'B,
        620.000                 '000000'B,
        621.000                 '100101'B,
        622.000                 '000000'B,
        623.000                 '100101'B,
        624.000                 '000000'B,
        625.000                 '100101'B,
        626.000                 '100101'B,
        627.000                 '000000'B,
        628.000                 '000000'B,
        629.000                 '000000'B,
        630.000                 '000000'B,
        631.000                 '000000'B,
        632.000                 '100110'B,
        633.000                 '100111'B,
        634.000                 '000000'B,
        635.000                 '000000'B,
        636.000                 '101000'B,
        637.000                 '000000'B,
        638.000                 '101000'B,
        639.000                 '101001'B,
        640.000                 '101010'B,
        641.000                 '000000'B,
        642.000                 '000000'B,
        643.000                 '000000'B,
        644.000                 '000000'B,
        645.000                 '101011'B,
        646.000                 '101001'B,
        647.000                 '000000'B,
        648.000                 '000000'B,
        649.000                 '000000'B,
        650.000                 '000000'B,
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STMT LEVEL NEST

                    651.000                 '000000'B,
                    652.000                 '000000'B,
                    653.000                 '000000'B,
                    654.000                 '001111'B,
                    655.000                 '000000'B,
                    656.000                 '000000'B,
                    657.000                 '000000'B,
                    658.000                 '000000'B,
                    659.000                 '000000'B,
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                    664.000                 '000000'B,
                    665.000                 '000000'B,
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                    668.000                 '000000'B,
                    669.000                 '000000'B,
                    670.000                 '000000'B,
                    671.000                 '000000'B,
                    672.000                 '000000'B,
                    673.000                 '000000'B,
                    674.000                 '000000'B,
                    675.000                 '000000'B,
                    676.000                 '000000'B,
                    677.000                 '000000'B,
                    678.000                 '000000'B,
                    679.000                 '000000'B,
                    680.000                 '000101'B,
                    681.000                 '000101'B,
                    682.000                 '011001'B,
                    683.000                 '000000'B,
                    684.000                 '011010'B,
                    685.000                 '000000'B,
                    686.000                 '000000'B,
                    687.000                 '000000'B,
                    688.000                 '000000'B,
                    689.000                 '000000'B,
                    690.000                 '000000'B,
                    691.000                 '000000'B);
                    692.000
  3     1           693.000       DCL SPRINT FILE PRINT,
                    694.000           (CLOCK,DAY) CHAR(8) EXTERNAL,
                    695.000           FIRST BIT(1) EXTERNAL;
                    696.000
  4     1           697.000       OPEN FILE(SPRINT) OUTPUT LINESIZE(132);
                    698.000
  5     1           699.000       FIRST = '1'B;
  6     1           700.000       DAY = DATE;
  7     1           701.000       CLOCK = TIME;
  8     1           702.000       PUT SKIP EDIT('DSL ALPHA',' JAN 1975',' DURHAM')
                    703.000                    (COL(4),A,X(4),A,X(4),A);
  9     1           704.000       PUT EDIT('CLOCK  ',CLOCK,'DATE  ',DAY)
```

```
STMT LEVEL NEST

                    705.000                 (X(12),A,A,X(3),A,A);
 10      1          706.000             PUT SKIP(4);
 11      1          707.000             PUT SKIP EDIT('SET "%DLC=?" IF YOU WISH TO USE THE '
                    708.000                          ||'UNDERSCORE CHARACTER IN IDENTIFIERS')
                    709.000                        (X(1),A);
 12      1          710.000             PUT SKIP(2);
 13      1          711.000             PUT SKIP;
 14      1          712.000             CALL PARSE;
                    713.000
 15      1          714.000   END;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
3	CLOCK	STATIC,EXTERNAL,UNALIGNED,STRING(8),CHARACTER 7,9
	DATE	BUILT-IN FUNCTION 6
3	DAY	STATIC,EXTERNAL,UNALIGNED,STRING(8),CHARACTER 6,9
2	ERROR_MESS	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(6),BIT
2	FAIL	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(2),BIT
3	FIRST	STATIC,EXTERNAL,UNALIGNED,STRING(1),BIT 5
2	FPL_LAB	(-4:220)STATIC,EXTERNAL,STRUCTURE,STRUCTURE
	PARSE	EXTERNAL,ENTRY,DECIMAL,FLOAT(SINGLE) 14
1	PROG	ENTRY,DECIMAL,FLOAT(SINGLE)
3	SPRINT	FILE,EXTERNAL,PRINT 4,8,9,10,11,12,13
2	SUCCESS	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(8),BIT
	TIME	BUILT-IN FUNCTION 7

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
2	FPL_LAB	450

STORAGE REQUIREMENTS.

THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PROG IS 224 BYTES LONG.

THE PROGRAM CSECT IS NAMED PROG AND IS 790 BYTES LONG.

THE STATIC CSECT IS NAMED ***PROGA AND IS 672 BYTES LONG.

STATISTICS SOURCE RECORDS = 714,PROG TEXT STMNTS = 15,OBJECT BYTES = 790

COMPILER DIAGNOSTICS.

WARNINGS.

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS.
SCARDS/SPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM0526I 1 OPTION MAIN HAS NOT BEEN SPECIFIED FOR THE EXTERNAL PROCEDURE, STATEMENT
NUMBER 1

END OF DIAGNOSTICS.

COMPILE TIME 13.34 SECS

ELAPSED TIME 6.51 MINS

```
PPPPPPPPP      AAAAAA      RRRRRRRR       SSSSSSSS     EEEEEEEEEE
PPPPPPPPPP    AAAAAAAA     RRRRRRRRR     SSSS   SSS    EEEEEEEEEE
PPP     PPP   AAA    AAA   RRR    RRR    SSS           EEE
PPPPPPPPPP    AAAAAAAAAA   RRRRRRRRR      SSSSSSSS     EEEEEE
PPPPPPPPP     AAAAAAAAAA   RRRRRRRR             SSS    EEE
PPP           AAA    AAA   RRR    RRR    SSS    SSSS   EEEEEEEEEE
PPP           AAA    AAA   RRR     RRR    SSSSSSSS     EEEEEEEEEE
```

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

DIAG

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
  EBCDIC
  CHAR60
NOMACRO
  SOURCE2
NOMACDCK
  COMP
  SOURCE
  ATR
  XREF
NOEXTREF
NOLIST
NOLOAD
  DECK
  FLAGW
  STMT
  SIZE=01P
  LINECNT=060
  OPT=01
  SORMGIN=(001,072)
NOEXTDIC
  NEST
  OPLIST
  SYNCHKS
  DIAG
```

```
*OPTIONS IN EFFECT*   EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,NOLOAD,
*OPTIONS IN EFFECT*   DECK,FLAGW,STMT,SIZE=01P,LINECNT=060,OPT=01,SORMGIN=(001,072),NOEXTDIC,
*OPTIONS IN EFFECT*   NEST,OPLIST,SYNCHKS,DIAG
```

```
STMT LEVEL NEST
  1                1.000  PARSE    : PROCEDURE;
                   2.000
                   3.000       /* ***************************************************************
                   4.000          ***************************************************************
                   5.000          *              INTERPRETATION  OF  FPL  STATEMENTS              *
                   6.000          *                                                               *
                   7.000          *                                 BY                            *
                   8.000          *                                                               *
                   9.000          *                        THE  SYNTAX  ANALYZER                  *
                  10.000          ***************************************************************
                  11.000          ***************************************************************
                  12.000       */
  2      1         13.000            DCL 1 FPL(-4:220) EXTERNAL,
                  14.000                  2 SYM_ON_STK BIT(6),
                  15.000                  2 INPUT_SYM BIT(6),
                  16.000                  2 SEM_ROUT BIT(6),
                  17.000                  2 REDUCED_BY BIT(3),
                  18.000                  2 DISCARD_BY BIT(2),
                  19.000                  2 SCAN BIT(2);
                  20.000
  3      1         21.000            DCL 1 FPL_LAB(-4:220) EXTERNAL,
                  22.000                  2 SUCCESS BIT(8),
                  23.000                  2 FAIL BIT(2),
                  24.000                  2 ERROR_MESS BIT(6);
                  25.000
  4      1         26.000            DCL EOS_VAL FIXED BIN EXTERNAL INITIAL(42),
                  27.000                PAROUT FILE OUTPUT,
                  28.000                CDOUT  FILE OUTPUT,
                  29.000                BUFFER CHAR(121) VAR EXTERNAL,
                  30.000                STACK(0:25) FIXED BIN EXTERNAL,
                  31.000                SER_FLG BIT(1) EXTERNAL,
                  32.000                NO_ERRS FIXED BIN EXTERNAL,
                  33.000                (CLOCK,DAY) CHAR(8) EXTERNAL,
                  34.000                (BUF_PTR,STK_PTR,FPL_PTR,LEX_VAL) FIXED BIN EXTERNAL;
                  35.000
                  36.000
                  37.000       /* ***************************************************************
                  38.000          *  ROUTINE  'PARSE' DIRECTS THE EXECUTION OF  FPL STATEMENTS  *
                  39.000          ***************************************************************
                  40.000       */
                  41.000
                  42.000
  5      1         43.000    WR_STK : PROCEDURE;
                  44.000
                  45.000       /* ***************************************************************
                  46.000          *  PROCEDURE  'WR_STK'  PRINTS  OUT  CERTAIN  VALUES  DURING  *
                  47.000          *  SYNTACTIC  ANALYSIS                                        *
                  48.000          ***************************************************************
                  49.000       */
  6      2         50.000            PUT FILE(PAROUT) SKIP EDIT(LEX_VAL,FPL_PTR,
                  51.000                                  FPL(FPL_PTR).SEM_ROUT,STK_PTR,
                  52.000                                  (STACK(I) DO I=0 TO STK_PTR))
                  53.000                                 (COL(1),4(F(8)),X(4),50(F(8)));
  7      2         54.000            PUT FILE(PAROUT) SKIP;
  8      2         55.000    END;
                  56.000
```

```
STMT LEVEL NEST
                        57.000
 9     1                58.000          OPEN FILE(PAROUT) OUTPUT LINESIZE(120);
10     1                59.000          OPEN FILE(CDOUT)  OUTPUT LINESIZE(120);
11     1                60.000          PUT  FILE(PAROUT) SKIP EDIT('  LEX_VAL   FPL_PTR  SEM_ROU'
                        61.000                                     ||'  STK_PTR      STACK')
                        62.000                                    (COL(1),A);
12     1                63.000          PUT  FILE(PAROUT) SKIP;
                        64.000          /*  SET FPL POINTER TO 1  */
13     1                65.000          FPL_PTR = 1;
                        66.000          /*  SET STACK POINTER TO 0  */
14     1                67.000          STK_PTR = 0;
                        68.000          /*  SET FIRST ELEMENT ON STACK TO 63  */
15     1                69.000          STACK(0) = 63;
                        70.000
16     1                71.000    PARSE :
                        72.000          IF (FPL(FPL_PTR).SYM_ON_STK=MOD(STACK(STK_PTR),100) |
                        73.000                                         FPL(FPL_PTR).SYM_ON_STK=0)
                        74.000           & (FPL(FPL_PTR).INPUT_SYM=MOD(LEX_VAL,100) |
                        75.000                                        FPL(FPL_PTR).INPUT_SYM=0)
17     1                76.000           THEN DO;
                        77.000                 /*  PATTERN MATCHING SUCCEEDS  */
18     1     1          78.000                 IF (FPL(FPL_PTR).SEM_ROUT¬=0 & ¬SER_FLG) |
                        79.000                    (FPL(FPL_PTR).SEM_ROUT>=55)
19     1     1          80.000                  THEN CALL SEM_ROU;
20     1     1          81.000                 STK_PTR = STK_PTR - FPL(FPL_PTR).REDUCED_BY;
21     1     1          82.000                 DO I=1 TO FPL(FPL_PTR).DISCARD_BY;
22     1     2          83.000                  IF LEX_VAL¬=EOS_VAL THEN CALL LEX_ANL;
24     1     2          84.000                 END;
25     1     1          85.000                 DO J=1 TO FPL(FPL_PTR).SCAN;
26     1     2          86.000                  STK_PTR = STK_PTR + 1;
27     1     2          87.000                  STACK(STK_PTR) = LEX_VAL;
28     1     2          88.000                  IF LEX_VAL¬=EOS_VAL THEN CALL LEX_ANL;
30     1     2          89.000                 END;
31     1     1          90.000                 CALL WR_STK;
32     1     1          91.000                 FPL_PTR = FPL_LAB(FPL_PTR).SUCCESS;
33     1     1          92.000                 IF FPL_PTR=0
34     1     1          93.000                  THEN DO;
35     1     2          94.000                        PUT SKIP LIST('END OF SESSION');
36     1     2          95.000                        PUT SKIP(3);
37     1     2          96.000                        DAY = DATE;
38     1     2          97.000                        CLOCK = TIME;
39     1     2          98.000                        PUT EDIT('OFF AT ',CLOCK,' ON ',DAY)
                        99.000                             (A,A,A,A);
40     1     2         100.000                        PUT SKIP;
41     1     2         101.000                        GOTO OUT;
42     1     2         102.000                       END;
43     1     1         103.000                 GOTO PARSE;
44     1     1         104.000                END;
                       105.000
                       106.000          /*  PATTERN MATCHING FAILS  */
45     1               107.000          IF FPL_LAB(FPL_PTR).FAIL¬=0
46     1               108.000           THEN DO;
                       109.000                 /*  SYNTAX ERROR DETECTED  */
47     1     1         110.000                 CALL SYN_ERR;
```

```
STMT LEVEL NEST

 48      1     1        111.000                    SER_FLG = '1'B;
 49      1     1        112.000                    NO_ERRS = NO_ERRS + 1;
 50      1     1        113.000                    IF STK_PTR¬=1
 51      1     1        114.000                     THEN STK_PTR = STK_PTR - 1;
 52      1     1        115.000                    IF FPL_LAB(FPL_PTR).FAIL=1
 53      1     1        116.000                     THEN FPL_PTR = -1;
 54      1     1        117.000                     ELSE
 54      1     1        118.000                      IF FPL_LAB(FPL_PTR).FAIL=2
 55      1     1        119.000                       THEN FPL_PTR = 0;
 56      1     1        120.000                       ELSE DO;
 57      1     2        121.000                             FPL_PTR = -2;
 58      1     2        122.000                             NO_ERRS = 0;
 59      1     2        123.000                            END;
 60      1     1        124.000                     GOTO PARSE;
 61      1     1        125.000                    END;
                        126.000
                        127.000              /*  FAIL LABEL ABSENT  */
 62      1              128.000              FPL_PTR = FPL_PTR + 1;
 63      1              129.000              GOTO PARSE;
                        130.000
 64      1              131.000    OUT : END;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
4 *********	BUF_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
4	BUFFER	STATIC,EXTERNAL,UNALIGNED,STRING(121),CHARACTER,VARYING
4	CDOUT	FILE,EXTERNAL,OUTPUT 10
4	CLOCK	STATIC,EXTERNAL,UNALIGNED,STRING(8),CHARACTER 38,39
	DATE	BUILT-IN FUNCTION 37
4	DAY	STATIC,EXTERNAL,UNALIGNED,STRING(8),CHARACTER 37,39
2	DISCARD_BY	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(2),BIT 21
4 *********	EOS_VAL	STATIC,EXTERNAL,ALIGNED,INITIAL,BINARY,FIXED(15,0) 22,28
3	ERROR_MESS	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT
3	FAIL	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(2),BIT 45,52,54
2	FPL	(-4:220)STATIC,EXTERNAL,STRUCTURE,STRUCTURE
3	FPL_LAB	(-4:220)STATIC,EXTERNAL,STRUCTURE,STRUCTURE
4 *********	FPL_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 6,6,13,16,16,16,16,18,18,20,21,25,32,32,33,45,52,53,54,55,57,62,62
*********	I	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 6,6,21
2	INPUT_SYM	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT 16,16
*********	J	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 25
*********	LEX_ANL	EXTERNAL,ENTRY,BINARY,FIXED(15,0) 23,29
4 *********	LEX_VAL	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 6,16,22,27,28
	MOD	GENERIC,BUILT-IN FUNCTION 16,16

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
4	*********	NO_ERRS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 49,49,58
64		OUT	STATEMENT LABEL CONSTANT 41
4		PAROUT	FILE,EXTERNAL,OUTPUT 6,7,9,11,12
1		PARSE	ENTRY,DECIMAL,FLOAT(SINGLE)
16		PARSE	STATEMENT LABEL CONSTANT 43,60,63
2		REDUCED_BY	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(3),BIT 20
2		SCAN	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(2),BIT 25
		SEM_ROU	EXTERNAL,ENTRY,DECIMAL,FLOAT(SINGLE) 19
2		SEM_ROUT	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT 6,18,18
4		SER_FLG	STATIC,EXTERNAL,UNALIGNED,STRING(1),BIT 18,48
		SPRINT	FILE,EXTERNAL 35,36,39,40
4	*********	STACK	(0:25)STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 6,15,16,27
4	*********	STK_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 6,6,14,16,20,20,26,26,27,50,51,51
3		SUCCESS	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(8),BIT 32
2		SYM_ON_STK	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT 16,16
		SYN_ERR	EXTERNAL,ENTRY,DECIMAL,FLOAT(SINGLE) 47
		TIME	BUILT-IN FUNCTION 38
5		WR_STK	ENTRY,DECIMAL,FLOAT(SINGLE) 31

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
2	FPL	704
3	FPL_LAB	450
4	STACK	52

STORAGE REQUIREMENTS.

THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PARSE IS 288 BYTES LONG.

THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED WR_STK IS 216 BYTES LONG.

THE PROGRAM CSECT IS NAMED PARSE AND IS 3094 BYTES LONG.

THE STATIC CSECT IS NAMED **PARSEA AND IS 1056 BYTES LONG.

STATISTICS SOURCE RECORDS = 131,PROG TEXT STMNTS = 64,OBJECT BYTES = 3094

COMPILER DIAGNOSTICS.

WARNINGS.

IEMC227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS.
SCARDS/SPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM0526I 1 OPTION MAIN HAS NOT BEEN SPECIFIED FOR THE EXTERNAL PROCEDURE, STATEMENT NUMBER 1

IEM1790I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS
16, 18, 20, 21, 25, 32, 45, 52, 54.

END OF DIAGNOSTICS.

COMPILE TIME	9.47 SECS
ELAPSED TIME	6.06 MINS

```
 SSSSSSSS   YYY      YYY   NNNN     NNN
SSSS   SSS   YYY    YYY   NNNNN    NNN
SSS           YYY YYY    NNNNNN   NNN
 SSSSSSSS      YYYYY     NNN NNN  NNN
       SSS      YYY      NNN  NNNNNN
 SSSSSSSS       YYY      NNN   NNNNN
       SSS      YYY      NNN    NNNN
SSS    SSSS     YYY      NNN     NNN
 SSSSSSSS       YYY      NNN     NNN
```

```
EEEEEEEEEE   RRRRRRRR     RRRRRRRR
EEEEEEEEEE   RRRRRRRRR    RRRRRRRRR
EEE          RRR   RRR    RRR   RRR
EEEEEE       RRRRRRRRR    RRRRRRRRR
EEE          RRRRRRRR     RRRRRRRR
EEEEEEEEEE   RRR   RRR    RRR   RRR
EEEEEEEEEE   RRR    RRR   RRR    RRR
```

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

DIAG

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
  EBCDIC
  CHAR60
NOMACRO
  SOURCE2
NOMACDCK
  COMP
  SOURCE
  ATR
  XREF
NOEXTREF
NOLIST
NOLOAD
  DECK
  FLAGW
  STMT
  SIZE=01P
  LINECNT=060
  OPT=01
  SORMGIN=(001,072)
NOEXTDIC
  NEST
  OPLIST
  SYNCHKS
  DIAG
```

```
*OPTIONS IN EFFECT*     EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,NOLOAD,
*OPTIONS IN EFFECT*     DECK,FLAGW,STMT,SIZE=01P,LINECNT=060,OPT=01,SORMGIN=(001,072),NOEXTDIC,
*OPTIONS IN EFFECT*     NEST,OPLIST,SYNCHKS,DIAG
```

```
STMT LEVEL NEST
  1                1.000  SYN_ERR : PROCEDURE;
                   2.000
                   3.000       /* ***************************************************************
                   4.000          ***************************************************************
                   5.000          *                    SYNTAX  ERROR  MESSAGES                  *
                   6.000          *                                                             *
                   7.000          *                          FOR                                *
                   8.000          *                                                             *
                   9.000          *                   DATA  SUBLANGUAGE   ALPHA                 *
                  10.000          ***************************************************************
                  11.000          ***************************************************************
                  12.000       */
  2      1         13.000            DCL 1 FPL_LAB(-4:220) EXTERNAL,
                  14.000                 2 SUCCESS BIT(8),
                  15.000                 2 FAIL BIT(2),
                  16.000                 2 ERROR_MESS BIT(6);
                  17.000
  3      1         18.000            DCL BUFFER CHAR(121) VAR EXTERNAL,
                  19.000                (BUF_PTR,FPL_PTR) FIXED BIN EXTERNAL,
                  20.000                ROUTINE(0:63) LABEL;
                  21.000
                  22.000
                  23.000       /* ***************************************************************
                  24.000          *  ROUTINE 'SYN_ERR'  PASSES  CONTROL  TO  THE  APPROPRIATE  *
                  25.000          *  SYNTAX  ERROR  MESSAGE  TO  BE  PRINTED                    *
                  26.000          ***************************************************************
                  27.000       */
                  28.000
                  29.000
  4      1         30.000    ERROR  : PROCEDURE(MESSAGE);
  5      2         31.000               DCL MESSAGE CHAR(150);
                   32.000
                  33.000        /* ***************************************************************
                  34.000           *  PROCEDURE 'ERROR' PRINTS  OUT THE SYNTAX ERROR MESSAGES  *
                  35.000           ***************************************************************
                  36.000        */
  6      2         37.000               PUT SKIP LIST(BUFFER);
  7      2         38.000               PUT SKIP EDIT('+')(COL(BUF_PTR-1),A);
  8      2         39.000               PUT SKIP LIST('* SYNTAX ERROR * ',MESSAGE);
  9      2         40.000               PUT SKIP;
 10      2         41.000    END;
                  42.000
                  43.000
 11      1         44.000               GOTO ROUTINE(FPL_LAB(FPL_PTR).ERROR_MESS);
                  45.000
 12      1         46.000               ROUTINE(1):
                  47.000                     PUT SKIP LIST(BUFFER);
 13      1         48.000                     PUT SKIP;
 14      1         49.000                     PUT SKIP EDIT('* * * * * * * * *       INVALID SOURCE '
                  50.000                                 ||'STATEMENT')(A);
 15      1         51.000                     PUT SKIP;
 16      1         52.000                     RETURN;
                  53.000
 17      1         54.000               ROUTINE(2):
                  55.000                     CALL ERROR('RANGE STATEMENT(S) MUST BE FOLLOWED BY '
                  56.000                               ||'A GET, HOLD OR DELETE STATEMENT');
```

```
STMT LEVEL NEST

 18     1          57.000          PUT SKIP;
 19     1          58.000          RETURN;
                   59.000
 20     1          60.000     ROUTINE(3):
                   61.000          CALL ERROR('THE KEYWORD "RANGE" MUST BE FOLLOWED BY '
                   62.000                     ||'A RELATION NAME');
 21     1          63.000          PUT SKIP;
 22     1          64.000          RETURN;
                   65.000
 23     1          66.000     ROUTINE(4):
                   67.000          CALL ERROR('THE RELATION NAME MUST BE FOLLOWED BY '
                   68.000                     ||'A LOCAL RELATION NAME');
 24     1          69.000          PUT SKIP;
 25     1          70.000          RETURN;
                   71.000
 26     1          72.000     ROUTINE(5):
                   73.000          CALL ERROR('END OF STATEMENT NOT DETECTED WHEN '
                   74.000                     ||'EXPECTED');
 27     1          75.000          PUT SKIP;
 28     1          76.000          RETURN;
                   77.000
 29     1          78.000     ROUTINE(6):
                   79.000          CALL ERROR('THE KEYWORD "GET" MUST BE FOLLOWED BY '
                   80.000                     ||'A WORKSPACE NAME');
 30     1          81.000          PUT SKIP;
 31     1          82.000          RETURN;
                   83.000
 32     1          84.000     ROUTINE(7):
                   85.000          CALL ERROR('INCORRECT SPECIFICATION OF TARGET ELEMENT '
                   86.000                     ||'IN TARGET LIST');
 33     1          87.000          PUT SKIP;
 34     1          88.000          RETURN;
                   89.000
 35     1          90.000     ROUTINE(8):
                   91.000          CALL ERROR('MISSING RIGHT PARENTHESIS FOLLOWING NUMBER'
                   92.000                     ||'/VARIABLE IN QUOTA');
 36     1          93.000          PUT SKIP;
 37     1          94.000          RETURN;
                   95.000
 38     1          96.000     ROUTINE(9):
                   97.000          CALL ERROR('MISSING LEFT PARENTHESIS FOLLOWING '
                   98.000                     ||'FUNCTION-IDENTIFIER');
 39     1          99.000          PUT SKIP;
 40     1         100.000          RETURN;
                  101.000
 41     1         102.000     ROUTINE(10):
                  103.000          CALL ERROR('INCORRECT USE OF FUNCTION IDENTIFIER IN '
                  104.000                     ||'FUNCTION DESIGNATOR');
 42     1         105.000          PUT SKIP;
 43     1         106.000          RETURN;
                  107.000
 44     1         108.000     ROUTINE(11):
                  109.000          CALL ERROR('MISSING LEFT PARENTHESIS FOLLOWING '
                  110.000                     ||'IMAGE FUNCTION IDENTIFIER');
```

```
STMT LEVEL NEST

 45     1          111.000          PUT SKIP;
 46     1          112.000          RETURN;
                   113.000
 47     1          114.000       ROUTINE(12):
                   115.000          CALL ERROR('INCORRECT USE OF IMAGE FUNCTION '
                   116.000                     ||'IDENTIFIER IN IMAGE FUNCTION '
                   117.000                     ||'DESIGNATOR');
 48     1          118.000          PUT SKIP;
 49     1          119.000          RETURN;
                   120.000
 50     1          121.000       ROUTINE(13):
                   122.000          CALL ERROR('INCORRECT SPECIFICATION OF ATTRIBUTE LIST '
                   123.000                     ||'IN IMAGE FUNCTION ARGUMENT');
 51     1          124.000          PUT SKIP;
 52     1          125.000          RETURN;
                   126.000
 53     1          127.000       ROUTINE(14):
                   128.000          CALL ERROR('MISSING COMMA FOLLOWING ATTRIBUTE LIST IN '
                   129.000                     ||'IMAGE FUNCTION ARGUMENT');
 54     1          130.000          PUT SKIP;
 55     1          131.000          RETURN;
                   132.000
 56     1          133.000       ROUTINE(15):
                   134.000          CALL ERROR('RIGHT PARENTHESIS NOT DETECTED WHEN '
                   135.000                     ||'EXPECTED');
 57     1          136.000          PUT SKIP;
 58     1          137.000          RETURN;
                   138.000
 59     1          139.000       ROUTINE(16):
                   140.000          CALL ERROR('MISSING ATTRIBUTE NAME FOLLOWING LOCAL '
                   141.000                    ||'RELATION NAME AND PERIOD');
 60     1          142.000          PUT SKIP;
 61     1          143.000          RETURN;
                   144.000
 62     1          145.000       ROUTINE(17):
                   146.000          CALL ERROR('INCORRECT SPECIFICATION OF '
                   147.000                     ||'QUALIFICATION EXPRESSION');
 63     1          148.000          PUT SKIP;
 64     1          149.000          RETURN;
                   150.000
 65     1          151.000       ROUTINE(18):
                   152.000          CALL ERROR('MISSING LOCAL RELATION NAME IN JOIN TERM '
                   153.000                     ||'FOLLOWING LEFT PARENTHESIS');
 66     1          154.000          PUT SKIP;
 67     1          155.000          RETURN;
                   156.000
 68     1          157.000       ROUTINE(19):
                   158.000          CALL ERROR('THE LOCAL RELATION NAME IN JOIN TERM '
                   159.000                     ||'MUST BE FOLLOWED BY A PERIOD AND '
                   160.000                     ||'ATTRIBUTE NAME');
 69     1          161.000          PUT SKIP;
 70     1          162.000          RETURN;
                   163.000
 71     1          164.000       ROUTINE(20):
```

```
STMT LEVEL NEST

                        165.000          CALL ERROR('MISSING RELATICNAL OPERATOR FOLLOWING '
                        166.000                    ||'LEFT HAND SIDE OF JOIN TERM');
 72      1              167.000          PUT SKIP;
 73      1              168.000          RETURN;
                        169.000
 74      1              170.000     ROUTINE(21):
                        171.000          CALL ERROR('INCORRECT SPECIFICATION OF RIGHT HAND '
                        172.000                    ||'SIDE OF JOIN TERM');
 75      1              173.000          PUT SKIP;
 76      1              174.000          RETURN;
                        175.000
 77      1              176.000     ROUTINE(22):
                        177.000          CALL ERROR('MISSING RIGHT PARENTHESIS FOLLOWING '
                        178.000                    ||'ATTRIBUTE NAME IN JOIN TERM');
 78      1              179.000          PUT SKIP;
 79      1              180.000          RETURN;
                        181.000
 80      1              182.000     ROUTINE(23):
                        183.000          CALL ERROR('INCORRECT USE OF BOOLEAN FUNCTION '
                        184.000                    ||'IDENTIFIER IN BOOLEAN FUNCTION '
                        185.000                    ||'DESIGNATOR');
 81      1              186.000          PUT SKIP;
 82      1              187.000          RETURN;
                        188.000
 83      1              189.000     ROUTINE(24):
                        190.000          CALL ERROR('THE KEYWORD "UP"/"DOWN" MUST BE FOLLOWED '
                        191.000                    ||'BY A LOCAL RELATION NAME, PERIOD AND '
                        192.000                    ||'ATTRIBUTE NAME');
 84      1              193.000          PUT SKIP;
 85      1              194.000          RETURN;
                        195.000
 86      1              196.000     ROUTINE(25):
                        197.000          CALL ERROR('MISSING RELATIONAL OPERATOR FOLLOWING '
                        198.000                    ||'IMAGE FUNCTION DESIGNATOR');
 87      1              199.000          PUT SKIP;
 88      1              200.000          RETURN;
                        201.000
 89      1              202.000     ROUTINE(26):
                        203.000          CALL ERROR('IMAGE FUNCTION DESIGNATOR MUST BE FOLLOWED'
                        204.000                    ||' BY A RELATIONAL OPERATOR AND NUMBER');
 90      1              205.000          PUT SKIP;
 91      1              206.000          RETURN;
                        207.000
 92      1              208.000     ROUTINE(27):
                        209.000          CALL ERROR('SYMBOL "$)" NOT  DETECTED WHEN EXPECTED');
 93      1              210.000          PUT SKIP;
 94      1              211.000          RETURN;
                        212.000
 95      1              213.000     ROUTINE(28):
                        214.000          CALL ERROR('THE KEYWORD "HOLD" MUST BE FOLLOWED BY '
                        215.000                    ||'A WORKSPACE NAME');
 96      1              216.000          PUT SKIP;
 97      1              217.000          RETURN;
                        218.000
```

```
STMT LEVEL NEST

 98     1          219.000        ROUTINE(29):
                   220.000              CALL ERROR('THE KEYWORD "DELETE" MUST BE FOLLOWED BY '
                   221.000                        ||'A LOCAL RELATION NAME');
 99     1          222.000              PUT SKIP;
100     1          223.000              RETURN;
                   224.000
101     1          225.000        ROUTINE(30):
                   226.000              CALL ERROR('THE KEYWORD "PUT" MUST BE FOLLOWED BY '
                   227.000                        ||'A WORKSPACE NAME');
102     1          228.000              PUT SKIP;
103     1          229.000              RETURN;
                   230.000
104     1          231.000        ROUTINE(31):
                   232.000              CALL ERROR('MISSING RELATION NAME FOLLOWING WORKSPACE '
                   233.000                        ||'NAME');
105     1          234.000              PUT SKIP;
106     1          235.000              RETURN;
                   236.000
107     1          237.000        ROUTINE(32):
                   238.000              CALL ERROR('INCORRECT SPECIFICATION OF ATTRIBUTE LIST '
                   239.000                        ||'FOLLOWING RELATION NAME');
108     1          240.000              PUT SKIP;
109     1          241.000              RETURN;
                   242.000
110     1          243.000        ROUTINE(33):
                   244.000              CALL ERROR('THE KEYWORD "UP"/"DOWN" MUST BE FOLLOWED '
                   245.000                        ||'BY A LOCAL RELATION NAME');
111     1          246.000              PUT SKIP;
112     1          247.000              RETURN;
                   248.000
113     1          249.000        ROUTINE(34):
                   250.000              CALL ERROR('THE KEYWORD "DROP" MUST BE FOLLOWED BY A '
                   251.000                        ||'DATA BASE RELATION NAME');
114     1          252.000              PUT SKIP;
115     1          253.000              RETURN;
                   254.000
116     1          255.000        ROUTINE(35):
                   256.000              CALL ERROR('THE KEYWORD "NEW" MUST BE FOLLOWED BY A '
                   257.000                        ||'DATA BASE RELATION NAME');
117     1          258.000              PUT SKIP;
118     1          259.000              RETURN;
                   260.000
119     1          261.000        ROUTINE(36):
                   262.000              CALL ERROR('MISSING LEFT PARENTHESIS FOLLOWING '
                   263.000                        ||'RELATION NAME');
120     1          264.000              PUT SKIP;
121     1          265.000              RETURN;
                   266.000
122     1          267.000        ROUTINE(37):
                   268.000              CALL ERROR('INCORRECT SPECIFICATION OF ATTRIBUTE '
                   269.000                        ||'FIELD');
123     1          270.000              PUT SKIP;
124     1          271.000              RETURN;
                   272.000
```

```
STMT LEVEL NEST

125     1          273.000        ROUTINE(38):
                   274.000              CALL ERROR('INVALID COMPUTATIONAL FACILITY '
                   275.000                         ||'STATEMENT');
126     1          276.000              PUT SKIP;
127     1          277.000              RETURN;
                   278.000
128     1          279.000        ROUTINE(39):
                   280.000              CALL ERROR('MISSING LEFT PARENTHESIS FOLLOWING THE '
                   281.000                         ||'KEYWORD "READ"/"LIST"');
129     1          282.000              PUT SKIP;
130     1          283.000              RETURN;
                   284.000
131     1          285.000        ROUTINE(40):
                   286.000              CALL ERROR('INCORRECT SPECIFICATION OF IDENTIFIER '
                   287.000                         ||'LIST IN READ/LIST STATEMENT');
132     1          288.000              PUT SKIP;
133     1          289.000              RETURN;
                   290.000
134     1          291.000        ROUTINE(41):
                   292.000              CALL ERROR('A WORKSPACE NAME MUST BE FOLLOWED BY '
                   293.000                         ||'A PERIOD AND ATTRIBUTE NAME');
135     1          294.000              PUT SKIP;
136     1          295.000              RETURN;
                   296.000
137     1          297.000        ROUTINE(42):
                   298.000              CALL ERROR('MISSING EQUAL SIGN FOLLOWING LEFT HAND '
                   299.000                         ||'SIDE OF ASSINGMENT STATEMENT');
138     1          300.000              PUT SKIP;
139     1          301.000              RETURN;
                   302.000
140     1          303.000        ROUTINE(43):
                   304.000              CALL ERROR('INCORRECT SPECIFICATION OF RIGHT PART '
                   305.000                         ||'OF ASSIGNMENT STATEMENT');
141     1          306.000              PUT SKIP;
142     1          307.000              RETURN;
                   308.000
143     1          309.000   END;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
3 *********	BUF_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 7
3	BUFFER	STATIC,EXTERNAL,UNALIGNED,STRING(121),CHARACTER,VARYING 6,12
4	ERROR	ENTRY,DECIMAL,FLOAT(SINGLE) 17,20,23,26,29,32,35,38,41,44,47,50,53,56,59,62,65,68,71,74,77,80,83 86,89,92,95,98,101,104,107,110,113,116,119,122,125,128,131,134,137 140
2	ERROR_MESS	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT 11
2	FAIL	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(2),BIT
2	FPL_LAB	(-4:220)STATIC,EXTERNAL,STRUCTURE,STRUCTURE
3 *********	FPL_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 11
5	MESSAGE	PARAMETER,UNALIGNED,STRING(150),CHARACTER 4,8
3	ROUTINE	(0:63)AUTOMATIC,INITIAL,LABEL 12,17,20,23,26,29,32,35,38,41,44,47,50,53,56,59,62,65,68,71,74,77,80 83,86,89,92,95,98,101,104,107,110,113,116,119,122,125,128,131,134 137,140,11
	SPRINT	FILE,EXTERNAL 6,7,8,9,12,13,14,15,18,21,24,27,30,33,36,39,42,45,48,51,54,57,60,63 66,69,72,75,78,81,84,87,90,93,96,99,102,105,108,111,114,117,120,123 126,129,132,135,138,141
2	SUCCESS	IN FPL_LAB(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(8),BIT
1	SYN_ERR	ENTRY,DECIMAL,FLOAT(SINGLE)

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
2	FFL_LAB	450
3	ROUTINE	512

STORAGE REQUIREMENTS.

THE STORAGE AREA FOR THE PROCEDURE LABELLED SYN_ERR IS 1008 BYTES LONG.

THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED ERROR IS 196 BYTES LONG.

THE PROGRAM CSECT IS NAMED SYN_ERR AND IS 4810 BYTES LONG.

THE STATIC CSECT IS NAMED SYN_ERRA AND IS 4324 BYTES LONG.

STATISTICS SOURCE RECORDS = 309,PROG TEXT STMNTS = 143,OBJECT BYTES = 4810

COMPILER DIAGNOSTICS.

WARNINGS.

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS.
SCARDS/SPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM0526I 1 OPTION MAIN HAS NOT BEEN SPECIFIED FOR THE EXTERNAL PROCEDURE, STATEMENT
NUMBER 1

IEM1790I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS
11.

END OF DIAGNOSTICS.

COMPILE TIME 13.80 SECS

ELAPSED TIME 6.62 MINS

VERSION 5.2C MTS PL/I COMPILER (F) TIME 07:11.09 DATE 02-11-75

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

DIAG

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
  EBCDIC
  CHAR60
NOMACRO
  SOURCE2
NOMACDCK
  COMP
  SOURCE
  ATR
  XREF
NOEXTREF
NOLIST
NOLOAD
  DECK
  FLAGW
  STMT
  SIZE=01P
  LINECNT=060
  OPT=01
  SORMGIN=(001,072)
NOEXTDIC
  NEST
  OPLIST
  SYNCHKS
  DIAG
```

OPTIONS IN EFFECT EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,NOLOAD,
OPTIONS IN EFFECT DECK,FLAGW,STMT,SIZE=01P,LINECNT=060,OPT=01,SORMGIN=(001,072),NOEXTDIC,
OPTIONS IN EFFECT NEST,OPLIST,SYNCHKS,DIAG

```
STMT LEVEL NEST
  1                1.000  SEM_ROU : PROCEDURE;
                   2.000
                   3.000       /* ***************************************************************
                   4.000          ***************************************************************
                   5.000          *          SEMANTIC  ANALYZER  &  TABLE  'GENERATOR'          *
                   6.000          *                                                             *
                   7.000          *                              FOR                            *
                   8.000          *                                                             *
                   9.000          *                    DATA  SUBLANGUAGE  ALPHA                 *
                  10.000          ***************************************************************
                  11.000          ***************************************************************
                  12.000       */
  2      1         13.000            DCL CDOUT FILE OUTPUT EXTERNAL,
                  14.000                BUFFER CHAR(121) VAR EXTERNAL,
                  15.000                STACK(0:25) FIXED BIN EXTERNAL,
                  16.000                FXD FIXED BIN(31) EXTERNAL,
                  17.000                FLT FLOAT(16) EXTERNAL,
                  18.000                ROUTINE(1:63) LABEL;
                  19.000
  3      1         20.000            DCL 1 RECORD EXTERNAL,
                  21.000                 2 NO_RV FIXED BIN,
                  22.000                 2 RA_TAB(10), 3(RNAME,LRNAME,QUANT,WCOMP) FIXED BIN,
                  23.000                 2 (ST_TAB,LRN_TAB,WN_TAB,RN_TAB,Q_TAB) FIXED BIN,
                  24.000                 2 NO_GTV FIXED BIN,
                  25.000                 2 GT_TAB(10), 3(FUNCT,ALIST,ALISTPTR,LRNAME,ANAME) FIXED
                  26.000                                                                    BIN,
                  27.000                 2 NO_HTV FIXED BIN,
                  28.000                2 HT_TAB(10), 3(LRNAME,ANAME) FIXED BIN,
                  29.000                2 NO_DT FIXED BIN,
                  30.000                2 DT_TAB(10), 3(LRNAME1,ANAME1,LRNAME2,ANAME2,RELOP,
                  31.000                                WCOMP,TCOMP) FIXED BIN,
                  32.000                2 NO_DTOV FIXED BIN,
                  33.000                2 DTOV_TAB(5), 3(RNAME,LRNAME,ANAME1,ANAME2,ATYPE,
                  34.000                                 APOSN1,APOSN2,RELOP,V#,WCOMP,TCOMP)
                  35.000                                FIXED BIN,
                  36.000                2 NO_MT FIXED BIN,
                  37.000                2 FN_MT_TAB(10), 3(FUNCT,ALIST,ALISTPTR,RNAME,LRNAME,
                  38.000                                   ANAME,APOSN,RELOP,V#,WCOMP,TCOMP,
                  39.000                                   CONTYPE,CONLEN,CONPTR) FIXED BIN,
                  40.000                2 NO_OV FIXED BIN,
                  41.000                2 OR_TAB(5), 3(ORDER,LRNAME,ANAME) FIXED BIN,
                  42.000                2 NO_WPV FIXED BIN,
                  43.000                2 WP_TAB(5), 3(WCOMP1,WCOMP2,OPER) FIXED BIN,
                  44.000                2 NO_ALV FIXED BIN,
                  45.000                2 AL_TAB(10) FIXED BIN,
                  46.000                2 NO_ATT FIXED BIN,
                  47.000                2 ATT_TAB(10), 3(ANAME,KTYPE,ATYPE,ALEN) FIXED BIN,
                  48.000                2 NO_IDV FIXED BIN,
                  49.000                2 ID_TAB(10) FIXED BIN,
                  50.000                2 NO_ASSV FIXED BIN,
                  51.000                2 ASS_TAB(30), 3(OP1,OP2,OPER,IOP1,IOP2) FIXED BIN,
                  52.000                2 NO_VAR FIXED BIN,
                  53.000                2 VAR_TAB(10), 3(RNAME,LRNAME,V#) FIXED BIN,
                  54.000                2 (NO_FB31,NO_FLT16,NO_CHAR) FIXED BIN,
                  55.000                2 FB31(10) FIXED BIN(31),
                  56.000                2 FLT16(10) FLOAT(16),
```

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STMT LEVEL NEST

                    57.000              2 CHARS(10) CHAR(20);
                    58.000
  4     1           59.000          DCL NULL(826) FIXED BIN BASED(PTR),
                    60.000              NULL1(785) FIXED BIN BASED(PTR1),
                    61.000              DUMPTR1 FIXED BIN(31) DEFINED PTR1;
                    62.000
  5     1           63.000          DCL 1 IDENTS(0:40) EXTERNAL,
                    64.000              2 IDENT_NAME CHAR(20) INITIAL(''),
                    65.000              2 IDENT_VAL FIXED BIN INITIAL(37),
                    66.000              2 INF_FLD FLOAT(16) INITIAL(0);
                    67.000
  6     1           68.000          DCL 1 FPL(-4:220) EXTERNAL,
                    69.000              2 SYM_ON_STK BIT(6),
                    70.000              2 INPUT_SYM BIT(6),
                    71.000              2 SEM_ROUT BIT(6),
                    72.000              2 REDUCED_BY BIT(3),
                    73.000              2 DISCARD_BY BIT(2),
                    74.000              2 SCAN BIT(2);
                    75.000
  7     1           76.000          DCL (ID_PSN,OID_PSN,NO_OTHS) FIXED BIN EXTERNAL,
                    77.000              (WS_BEG,NO_WS,VAR_BEG,NO_VARS) FIXED BIN EXTERNAL,
                    78.000              (BUF_PTR,STK_PTR,FPL_PTR) FIXED BIN EXTERNAL,
                    79.000              (BUF_LEN,LEX_VAL) FIXED BIN EXTERNAL,
                    80.000              (FIRST,SER_FLG,ID_OFLW) BIT(1) EXTERNAL,
                    81.000              NO_ERRS FIXED BIN EXTERNAL,
                    82.000              STRING CHAR(20) VAR EXTERNAL,
                    83.000              (AL_PTR,WPSTK_PTR,FUNCT_PSN) FIXED BIN STATIC,
                    84.000              (SEM1,SEM2,SEM3,SEM4,SEM5) FIXED BIN STATIC,
                    85.000              (WP_STK(5),C_WCOMP,C_TCOMP) FIXED BIN STATIC,
                    86.000              (COMP_STK(20),CSTK_PTR) FIXED BIN STATIC,
                    87.000              (NO_TRV,NO_NIDV,UDWS_PSN) FIXED BIN STATIC,
                    88.000              (RANGE,FUNCT,HOLD_WS) BIT(1) STATIC;
                    89.000
  8     1           90.000          DCL RNO_VAL FIXED BIN EXTERNAL INITIAL(236),
                    91.000              INT_VAL FIXED BIN EXTERNAL INITIAL(136),
                    92.000              WS_VAL  FIXED BIN EXTERNAL INITIAL(38);
                    93.000
  9     1           94.000          DCL DBRN_VAL FIXED BIN STATIC INITIAL(39),
                    95.000              LRN_VAL  FIXED BIN STATIC INITIAL(40),
                    96.000              RGE_VAL  FIXED BIN STATIC INITIAL(116),
                    97.000              GET_VAL  FIXED BIN STATIC INITIAL(1),
                    98.000              DEL_VAL  FIXED BIN STATIC INITIAL(2),
                    99.000              HOLD_VAL FIXED BIN STATIC INITIAL(4),
                   100.000              NEW_VAL  FIXED BIN STATIC INITIAL(8),
                   101.000              DROP_VAL FIXED BIN STATIC INITIAL(3),
                   102.000              PUT_VAL  FIXED BIN STATIC INITIAL(7),
                   103.000              READ_VAL FIXED BIN STATIC INITIAL(9),
                   104.000              LIST_VAL FIXED BIN STATIC INITIAL(109),
                   105.000              CBR_VAL  FIXED BIN STATIC INITIAL(132),
                   106.000              EQ_VAL   FIXED BIN STATIC INITIAL(324),
                   107.000              ICNT_VAL FIXED BIN STATIC INITIAL(218),
                   108.000              PLUS_VAL FIXED BIN STATIC INITIAL(122),
                   109.000              SUB_VAL  FIXED BIN STATIC INITIAL(222),
                   110.000              NEG_VAL  FIXED BIN STATIC INITIAL(43),
```

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STMT LEVEL NEST
                    111.000              VAR_VAL  FIXED BIN STATIC INITIAL(41),
                    112.000              IFN_VAL  FIXED BIN STATIC INITIAL(18),
                    113.000              INT_TYPE FIXED BIN STATIC INITIAL(1),
                    114.000              RNO_TYPE FIXED BIN STATIC INITIAL(3),
                    115.000              CH_TYPE  FIXED BIN STATIC INITIAL(5),
                    116.000              INT_VAR  FIXED BIN STATIC INITIAL(141),
                    117.000              RNO_VAR  FIXED BIN STATIC INITIAL(241),
                    118.000              ENC_WS   FIXED BIN STATIC INITIAL(30),
                    119.000              END_VARS FIXED BIN STATIC INITIAL(40),
                    120.000              OP_NIL   FIXED BIN STATIC INITIAL(0),
                    121.000              OP_FXD   FIXED BIN STATIC INITIAL(1),
                    122.000              OP_PTR   FIXED BIN STATIC INITIAL(2),
                    123.000              OP_FLT   FIXED BIN STATIC INITIAL(3),
                    124.000              OP_LNO   FIXED BIN STATIC INITIAL(4),
                    125.000              OP_CH    FIXED BIN STATIC INITIAL(5);
                    126.000
 10      1          127.000          DCL MAX_RV    FIXED BIN STATIC INITIAL(10),
                    128.000              MAX_GTV   FIXED BIN STATIC INITIAL(10),
                    129.000              MAX_HTV   FIXED BIN STATIC INITIAL(10),
                    130.000              MAX_DT    FIXED BIN STATIC INITIAL(10),
                    131.000              MAX_DTOV  FIXED BIN STATIC INITIAL(10),
                    132.000              MAX_MT    FIXED BIN STATIC INITIAL(10),
                    133.000              MAX_OV    FIXED BIN STATIC INITIAL(5),
                    134.000              MAX_WPV   FIXED BIN STATIC INITIAL(4),
                    135.000              MAX_ALV   FIXED BIN STATIC INITIAL(10),
                    136.000              MAX_ATT   FIXED BIN STATIC INITIAL(10),
                    137.000              MAX_IDV   FIXED BIN STATIC INITIAL(10),
                    138.000              MAX_FB31  FIXED BIN STATIC INITIAL(5),
                    139.000              MAX_FLT16 FIXED BIN STATIC INITIAL(5),
                    140.000              MAX_CHAR  FIXED BIN STATIC INITIAL(5);
                    141.000
                    142.000
                    143.000          /* ***************************************************************
                    144.000             *  ROUTINE  'SEM_ROU'  PASSES  CONTROL  TO  THE  APPROPRIATE  *
                    145.000             *  SEMANTIC  ROUTINE  TO  BE  EXECUTED                        *
                    146.000             ***************************************************************
                    147.000          */
                    148.000
                    149.000
 11      1          150.000     ERROR  : PROCEDURE(MESSAGE);
 12      2          151.000              DCL MESSAGE CHAR(120);
                    152.000
                    153.000          /* ***************************************************************
                    154.000             *  PROCEDURE 'ERROR' PRINTS OUT  THE SEMANTIC ERROR MESSAGES  *
                    155.000             ***************************************************************
                    156.000          */
 13      2          157.000              PUT SKIP LIST(BUFFER);
 14      2          158.000              PUT SKIP EDIT('+')(COL(BUF_PTR-1),A);
 15      2          159.000              PUT SKIP LIST('* SEVERE ERROR *   ',MESSAGE);
 16      2          160.000              PUT SKIP;
 17      2          161.000     END;
                    162.000
                    163.000
 18      1          164.000     DEL_ST : PROCEDURE;
```

```
STMT LEVEL NEST
                    165.000
                    166.000       /* ****************************************************************
                    167.000          *  PROCEDURE 'DEL_ST' PRINTS OUT  THE MESSAGE THAT STATEMENT  *
                    168.000          *  HAS BEEN DELETED DUE TO ERRORS DETECTED                    *
                    169.000          ****************************************************************
                    170.000       */
 19     2           171.000            PUT EDIT('STATEMENT HAS BEEN DELETED DUE TO ')(COL(25),A);
 20     2           172.000            IF NO_ERRS=1
 21     2           173.000             THEN PUT EDIT('AN ERROR')(A);
 22     2           174.000             ELSE PUT EDIT(NO_ERRS,' ERRORS')(F(2),A);
 23     2           175.000            PUT EDIT(' NOTED ELSEWHERE')(A);
 24     2           176.000            PUT SKIP;
 25     2           177.000    END;
                    178.000
                    179.000
 26     1           180.000    IFB_PSN: PROCEDURE(FXD) RETURNS(FIXED BIN);
 27     2           181.000             DCL FXD FIXED BIN(31),
                    182.000                 CON_PTR FIXED BIN;
                    183.000
                    184.000       /* ****************************************************************
                    185.000          *  PROCEDURE 'IFB_PSN' RETURNS A POINTER  TO THE LOCATION OF  *
                    186.000          *  THE INTEGER IN THE CONSTANT TABLE                          *
                    187.000          ****************************************************************
                    188.000       */
 28     2           189.000            DO CON_PTR=1 TO NO_FB31;
 29     2     1     190.000             IF FXD=FB31(CON_PTR)
 30     2     1     191.000              THEN GOTO FOUND;
 31     2     1     192.000            END;
 32     2           193.000            IF NO_FB31>=MAX_FB31
 33     2           194.000             THEN DO;
 34     2     1     195.000                   SER_FLG = '1'B;
 35     2     1     196.000                   NO_ERRS = NO_ERRS + 1;
 36     2     1     197.000                   CALL ERROR('IMPLEMENTATION RESTRICTION - TOO MANY '
                    198.000                              ||'INTEGER CONSTANTS USED');
 37     2     1     199.000                   PUT SKIP;
 38     2     1     200.000                   CON_PTR = 0;
 39     2     1     201.000                  END;
 40     2           202.000             ELSE DO;
 41     2     1     203.000                   NO_FB31 = CON_PTR;
 42     2     1     204.000                   FB31(NO_FB31) = FXD;
 43     2     1     205.000                  END;
 44     2           206.000     FOUND : RETURN(CON_PTR);
 45     2           207.000    END;
                    208.000
                    209.000
 46     1           210.000   IFLT_PSN: PROCEDURE(FLT) RETURNS(FIXED BIN);
 47     2           211.000             DCL FLT FLOAT(16),
                    212.000                 CON_PTR FIXED BIN;
                    213.000
                    214.000       /* ****************************************************************
                    215.000          *  PROCEDURE 'IFLT_PSN' RETURNS A POINTER TO THE LOCATION OF  *
                    216.000          *  THE REAL NUMBER IN THE CONSTANT TABLE                      *
                    217.000          ****************************************************************
                    218.000       */
```

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STMT LEVEL NEST
 48     2          219.000           DO CON_PTR=1 TO NO_FLT16;
 49     2    1     220.000            IF FLT=FLT16(CON_PTR)
 50     2    1     221.000             THEN GOTO FOUND;
 51     2    1     222.000           END;
 52     2          223.000           IF NO_FLT16>=MAX_FLT16
 53     2          224.000            THEN DO;
 54     2    1     225.000                  SER_FLG = '1'B;
 55     2    1     226.000                  NO_ERRS = NO_ERRS + 1;
 56     2    1     227.000                  CALL ERROR('IMPLEMENTATION RESTRICTION - TOO MANY '
                   228.000                             ||'REAL CONSTANTS USED');
 57     2    1     229.000                  PUT SKIP;
 58     2    1     230.000                  CON_PTR = 0;
 59     2    1     231.000                 END;
 60     2          232.000            ELSE DO;
 61     2    1     233.000                  NO_FLT16 = CON_PTR;
 62     2    1     234.000                  FLT16(NO_FLT16) = FLT;
 63     2    1     235.000                 END;
 64     2          236.000    FOUND :  RETURN(CON_PTR);
 65     2          237.000   END;
                   238.000
                   239.000
 66     1          240.000  ICH_PSN : PROCEDURE(STRING) RETURNS(FIXED BIN);
 67     2          241.000           DCL STRING CHAR(20) VAR,
                   242.000               CON_PTR FIXED BIN;
                   243.000
                   244.000       /* ****************************************************************
                   245.000          *  PROCEDURE 'ICH_PSN' RETURNS A POINTER  TO THE LOCATION OF  *
                   246.000          *  THE CHARACTER STRING IN THE CONSTANT TABLE                  *
                   247.000          ****************************************************************
                   248.000       */
 68     2          249.000            DO CON_PTR=1 TO NO_CHAR;
 69     2    1     250.000             IF STRING=CHARS(CON_PTR)
 70     2    1     251.000              THEN GOTO FOUND;
 71     2    1     252.000            END;
 72     2          253.000            IF NO_CHAR>=MAX_CHAR
 73     2          254.000             THEN DO;
 74     2    1     255.000                   SER_FLG = '1'B;
 75     2    1     256.000                   NO_ERRS = NO_ERRS + 1;
 76     2    1     257.000                   CALL ERROR('IMPLEMENTATION RESTRICTION - TOO MANY '
                   258.000                              ||'STRING CONSTANTS USED');
 77     2    1     259.000                   PUT SKIP;
 78     2    1     260.000                   CON_PTR = 0;
 79     2    1     261.000                  END;
 80     2          262.000             ELSE DO;
 81     2    1     263.000                   NO_CHAR = CON_PTR;
 82     2    1     264.000                   CHARS(NO_CHAR) = STRING;
 83     2    1     265.000                  END;
 84     2          266.000    FOUND  :  RETURN(CON_PTR);
 85     2          267.000  END;
                   268.000
                   269.000
 86     1          270.000  SC_RATAB: PROCEDURE(ID_PSN);
 87     2          271.000           DCL (ID_PSN,RPOSN) FIXED BIN;
                   272.000
```

```
STMT LEVEL NEST
                    273.000       /* ****************************************************************
                    274.000          *  PROCEDURE 'SC_RATAB'  FILLS IN THE W COMPONENT NUMBER FOR  *
                    275.000          *  EACH LOCAL RELATION NAME IN RA_TAB                         *
                    276.000          ****************************************************************
                    277.000       */
 88     2           278.000            RPOSN = 0;
 89     2           279.000            DO I=1 TO NO_RV;
 90     2    1      280.000             IF RA_TAB.LRNAME(I)=ID_PSN
 91     2    1      281.000              THEN DO;
 92     2    2      282.000                    RPOSN = I;
 93     2    2      283.000                    IF RA_TAB.WCOMP(I)=0 | RA_TAB.WCOMP(I)=C_WCOMP
 94     2    2      284.000                     THEN DO;
 95     2    3      285.000                           RA_TAB.WCOMP(I) = C_WCOMP;
 96     2    3      286.000                           GOTO OUT;
 97     2    3      287.000                          END;
 98     2    2      288.000                   END;
 99     2    1      289.000            END;
100     2           290.000            IF RPOSN¬=0
101     2           291.000             THEN DO;
102     2    1      292.000                    NO_RV = NO_RV + 1;
103     2    1      293.000                    RA_TAB.RNAME(NO_RV) = RA_TAB.RNAME(RPOSN);
104     2    1      294.000                    RA_TAB.LRNAME(NO_RV) = RA_TAB.LRNAME(RPOSN);
105     2    1      295.000                    RA_TAB.QUANT(NO_RV) = RA_TAB.QUANT(RPOSN);
106     2    1      296.000                    RA_TAB.WCOMP(NO_RV) = C_WCOMP;
107     2    1      297.000                   END;
108     2           298.000  OUT :  END;
                    299.000
                    300.000
109     1           301.000       GOTO ROUTINE(FPL(FPL_PTR).SEM_ROUT);
                    302.000
110     1           303.000       ROUTINE(1):
                    304.000             PUT FILE(CDOUT) SKIP;
111     1           305.000             PUT FILE(CDOUT) SKIP;
112     1           306.000             IF NO_OTHS¬=0
113     1           307.000              THEN DO;
114     1    1      308.000                    PUT FILE(CDOUT) EDIT('SYMBOL TABLE')
                    309.000                                    (COL(2),A);
115     1    1      310.000                    PUT FILE(CDOUT) EDIT('------------')
                    311.000                                    (COL(2),A);
116     1    1      312.000                    PUT FILE(CDOUT) SKIP;
                    313.000                    /*  PRINT OUT CONTENTS OF SYMBOL TABLE  */
117     1    1      314.000                    PUT FILE(CDOUT) EDIT((I,'. ',IDENTS(I)
                    315.000                                      DO I=1 TO NO_OTHS))
                    316.000                                    (F(4),A,A,2(F(10)),SKIP);
118     1    1      317.000                    PUT FILE(CDOUT) SKIP(2);
119     1    1      318.000                   END;
120     1           319.000             IF NO_WS¬=20
121     1           320.000              THEN DO;
122     1    1      321.000                    PUT FILE(CDOUT) EDIT('WORKSPACE TABLE')
                    322.000                                    (COL(2),A);
123     1    1      323.000                    PUT FILE(CDOUT) EDIT('---------------')
                    324.000                                    (COL(2),A);
124     1    1      325.000                    PUT FILE(CDOUT) SKIP;
                    326.000                    /*  PRINT OUT CONTENTS OF WORKSPACE TABLE  */
```

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STMT LEVEL NEST

125     1    1      327.000          PUT FILE(CDOUT) EDIT((I,'. ',IDENT_NAME(I)
                    328.000                           DO I=WS_BEG TO NO_WS))
                    329.000                         (F(4),A,A,SKIP);
126     1    1      330.000          PUT FILE(CDOUT) SKIP(2);
127     1    1      331.000        END;
128     1           332.000    IF NO_VARS¬=30
129     1           333.000     THEN DO;
130     1    1      334.000          PUT FILE(CDOUT) EDIT('VARIABLE TABLE')
                    335.000                         (COL(2),A);
131     1    1      336.000          PUT FILE(CDOUT) EDIT('--------------')
                    337.000                         (COL(2),A);
132     1    1      338.000          PUT FILE(CDOUT) SKIP;
                    339.000          /*  PRINT OUT CONTENTS OF VARIABLE TABLE  */
133     1    1      340.000          PUT FILE(CDOUT) EDIT((I,'. ',IDENT_NAME(I)
                    341.000                           DO I=VAR_BEG TO NO_VARS))
                    342.000                         (F(4),A,A,SKIP);
134     1    1      343.000          PUT FILE(CDOUT) SKIP(2);
135     1    1      344.000        END;
136     1           345.000    IF NO_FB31¬=0 | NO_FLT16¬=0 | NO_CHAR¬=0
137     1           346.000     THEN DO;
138     1    1      347.000          PUT FILE(CDOUT) EDIT('CONSTANT TABLE')
                    348.000                         (COL(2),A);
139     1    1      349.000          PUT FILE(CDOUT) EDIT('--------------')
                    350.000                         (COL(2),A);
140     1    1      351.000          PUT FILE(CDOUT) SKIP;
                    352.000          /*  PRINT OUT CONTENTS OF CONSTANT TABLE  */
141     1    1      353.000          IF NO_FB31¬=0
142     1    1      354.000           THEN DO;
143     1    2      355.000                PUT FILE(CDOUT) EDIT('FB31')(COL(3),A);
144     1    2      356.000                PUT FILE(CDOUT) SKIP;
145     1    2      357.000                PUT FILE(CDOUT) EDIT((I,'. ',FB31(I)
                    358.000                                 DO I=1 TO NO_FB31))
                    359.000                               (F(7),A,F(10),SKIP);
146     1    2      360.000                PUT FILE(CDOUT) SKIP(2);
147     1    2      361.000              END;
148     1    1      362.000          IF NO_FLT16¬=0
149     1    1      363.000           THEN DO;
150     1    2      364.000                PUT FILE(CDOUT) EDIT('FLT16')(COL(3),A);
151     1    2      365.000                PUT FILE(CDOUT) SKIP;
152     1    2      366.000                PUT FILE(CDOUT) EDIT((I,'. ',FLT16(I)
                    367.000                                 DO I=1 TO NO_FLT16))
                    368.000                              (F(7),A,F(10,7),SKIP);
153     1    2      369.000                PUT FILE(CDOUT) SKIP(2);
154     1    2      370.000              END;
155     1    1      371.000          IF NO_CHAR¬=0
156     1    1      372.000           THEN DO;
157     1    2      373.000                PUT FILE(CDOUT) EDIT('CHARS')(COL(3),A);
158     1    2      374.000                PUT FILE(CDOUT) SKIP;
159     1    2      375.000                PUT FILE(CDOUT) EDIT((I,'. ',CHARS(I)
                    376.000                                 DO I=1 TO NO_CHAR))
                    377.000                               (F(7),A,A,SKIP);
160     1    2      378.000                PUT FILE(CDOUT) SKIP(2);
161     1    2      379.000              END;
162     1    1      380.000    END;
```

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STMT LEVEL NEST
163      1          381.000            CALL INTERPR;
                    382.000            /*  CLEAR WHOLE RECORD  */
164      1          383.000            PTR = ADDR(RECORD);
165      1          384.000            NULL = 0;
                    385.000            /*  CLEAR SYMBOL TABLE  */
166      1          386.000            NO_OTHS = 0;
167      1          387.000           RETURN;
                    388.000
168      1          389.000      ROUTINE(2):
                    390.000            SEM1 = CID_PSN;
169      1          391.000            SEM2 = IDENT_VAL(CID_PSN);
170      1          392.000            RETURN;
                    393.000
171      1          394.000      ROUTINE(3):
                    395.000            SEM1 = CID_PSN;
172      1          396.000            SEM2 = DBRN_VAL;
173      1          397.000            RETURN;
                    398.000
174      1          399.000      ROUTINE(4):
                    400.000            SEM3 = ID_PSN;
175      1          401.000            SEM4 = LRN_VAL;
176      1          402.000            SEM5 = 0;
177      1          403.000            RETURN;
                    404.000
178      1          405.000      ROUTINE(5):
                    406.000            SEM5 = LEX_VAL/100;
179      1          407.000            RETURN;
                    408.000
180      1          409.000      ROUTINE(6):
                    410.000            /*  CHECK FOR NO PREVIOUS SIMILAR DECLARATION
                    411.000                OF RANGE STATEMENT  */
                    412.000            DO I=1 TO NO_RV;
181      1     1    413.000             IF SEM1=RA_TAB.RNAME(I) & SEM5=RA_TAB.QUANT(I)
182      1     1    414.000              THEN DO;
183      1     2    415.000                    SER_FLG = '1'B;
184      1     2    416.000                    NO_ERRS = NO_ERRS + 1;
185      1     2    417.000                    CALL ERROR('IMPLEMENTATION RESTRICTION - A '
                    418.000                               ||'PREVIOUS SIMILAR DECLARATION '
                    419.000                               ||'OF RANGE STATEMENT');
186      1     2    420.000                    PUT SKIP;
187      1     2    421.000                    GOTO ROUTINE(62);
188      1     2    422.000                   END;
189      1     1    423.000            END;
                    424.000
190      1          425.000            IF SEM1¬=SEM3
191      1          426.000             THEN DO;
                    427.000                   /*  ALTER IDENTIFIER-TYPE IN SYMBOL TABLE  */
192      1     1    428.000                   IDENT_VAL(SEM1) = SEM2;
193      1     1    429.000                   IDENT_VAL(SEM3) = SEM4;
                    430.000                   /*  FILL IN RA_TAB FOR RANGE STATEMENT  */
194      1     1    431.000                   NO_RV = NO_RV + 1;
195      1     1    432.000                   IF NO_RV>MAX_RV
196      1     1    433.000                    THEN DO;
197      1     2    434.000                          SER_FLG = '1'B;
```

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198    1    2                  NO_ERRS = NO_ERRS + 1;
199    1    2                  CALL ERROR('IMPLEMENTATION RESTRICTION -'
                                           ||' TOO MANY RANGE '
                                           ||'STATEMENTS DECLARED');
200    1    2                  PUT SKIP;
201    1    2                  GCTO RCUTINE(62);
202    1    2                 END;
203    1    1             RA_TAB.RNAME(NO_RV) = SEM1;
204    1    1             RA_TAB.LRNAME(NO_RV) = SEM3;
205    1    1             RA_TAB.QUANT(NO_RV) = SEM5;
206    1    1             NO_TRV = NO_RV;
207    1    1             IDENTS.INF_FLD(SEM3) = SEM5;
208    1    1             RANGE = '1'B;
209    1    1            END;
210    1           ELSE DO;
211    1    1             SER_FLG = '1'B;
212    1    1             NO_ERRS = NC_ERRS + 1;
213    1    1             CALL ERROR('SPECIFICATION OF THE SAME '
                                    ||'IDENTIFIER FOR RELATION NAME '
                                    ||'AND LOCAL RELATICN NAME');
214    1    1             PUT SKIP;
215    1    1             GOTO ROUTINE(62);
216    1    1            END;
217    1          RETURN;

218    1      ROUTINE(7):
                  /*  FILL IN TYPE OF STATEMENT IN ST_TAB
                      FOR RANGE/DROP/NEW/PUT/COMPUTATIONAL
                      FACILITY STATEMENT  */
                  ST_TAB = STACK(STK_PTR);

219    1          IF ST_TAB=RGE_VAL
220    1           THEN RANGE = '0'B;
221    1           ELSE
221    1           IF ST_TAB=READ_VAL
222    1            THEN NO_NIDV = 0;
223    1            ELSE
223    1            IF ST_TAB=WS_VAL
224    1             THEN DO;
225    1    1              CSTK_PTR = 0;
226    1    1              IF HOLD_WS & ID_PSN¬=UDWS_PSN
227    1    1               THEN DO;
228    1    2                     SER_FLG = '1'B;
229    1    2                     NO_ERRS = NC_ERRS + 1;
230    1    2                     CALL ERROR('WORKSPACE TO BE UPDATED IS'
                                             ||' NOT THE ONE SPECIFIED '
                                             ||'IN THE HOLD STATEMENT');
231    1    2                     PUT SKIP;
232    1    2                    END;
233    1    1              HOLD_WS = '0'B;
234    1    1             END;
235    1          RETURN;

236    1      ROUTINE(8):
```

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                          489.000  /*  FILL IN TYPE OF STATEMENT IN ST_TAB
                          490.000      FOR GET/HOLD/DELETE STATEMENT  */
                          491.000  ST_TAB = STACK(STK_PTR);
                          492.000  /*  FILL IN WORKSPACE/LOCAL RELATION NAME IN
                          493.000      WN_TAB/LRN_TAB FOR GET-HOLD/DELETE STATEMENT  */
237     1                 494.000  IF ST_TAB=DEL_VAL
238     1                 495.000   THEN DO;
239     1     1           496.000         IF IDENTS.INF_FLD(ID_PSN)¬=0
240     1     1           497.000          THEN DO;
241     1     2           498.000                SER_FLG = '1'B;
242     1     2           499.000                NO_ERRS = NO_ERRS + 1;
243     1     2           500.000                CALL ERROR('TUPLES TO BE DELETED SHOULD '
                          501.000                           ||'NOT BE QUANTIFIED');
244     1     2           502.000                PUT SKIP;
245     1     2           503.000                GOTO L3;
246     1     2           504.000               END;
247     1     1           505.000          ELSE LRN_TAB = ID_PSN;
248     1     1           506.000        END;
249     1                 507.000   ELSE
249     1                 508.000   IF NO_WS+1>END_WS & IDENT_VAL(ID_PSN)¬=WS_VAL
250     1                 509.000    THEN DO;
251     1     1           510.000          SER_FLG = '1'B;
252     1     1           511.000          NO_ERRS = NO_ERRS + 1;
253     1     1           512.000          CALL ERROR('IMPLEMENTATION RESTRICTION -'
                          513.000                     ||' YOU HAVE EXCEEDED THE '
                          514.000                     ||'NUMBER OF WORKSPACES '
                          515.000                     ||'ALLOCATED');
254     1     1           516.000                PUT SKIP;
255     1     1           517.000                GOTO L3;
256     1     1           518.000               END;
257     1                 519.000           ELSE WN_TAB = ID_PSN;
                          520.000
258     1                 521.000         FUNCT = '0'B;
259     1                 522.000         WPSTK_PTR = 1;
260     1                 523.000         C_WCOMP = 1;
261     1                 524.000         C_TCOMP = 1;
262     1                 525.000         WP_STK(WPSTK_PTR) = C_WCOMP;
263     1                 526.000         L3 : RETURN;
                          527.000
264     1                 528.000  ROUTINE(9):
                          529.000         /*  FILL IN QUOTA IN Q_TAB  */
                          530.000         Q_TAB = FXD;
265     1                 531.000         RETURN;
                          532.000
266     1                 533.000  ROUTINE(10):
                          534.000         /*  FILL IN QUOTA IN Q_TAB  */
                          535.000         IF LEX_VAL¬=INT_VAR
267     1                 536.000          THEN DO;
268     1     1           537.000                SER_FLG = '1'B;
269     1     1           538.000                NO_ERRS = NO_ERRS + 1;
270     1     1           539.000                CALL ERROR('REAL IDENTIFIER USED AS QUOTA');
271     1     1           540.000                PUT SKIP;
272     1     1           541.000               END;
273     1                 542.000           ELSE Q_TAB = IDENTS.INF_FLD(ID_PSN);
```

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 274    1             543.000            RETURN;
                      544.000
 275    1             545.0C0        ROUTINE(11):
                      546.000            /*  CHECK FOR NO QUANTIFICATION OF LOCAL RELATICN
                      547.000                NAME USED IN TARGET LIST  */
                      548.CC0            IF IDENTS.INF_FLD(IC_PSN)¬=0
 276    1             549.000             THEN DO;
 277    1    1        550.00C                   SER_FLG = '1'B;
 278    1    1        551.0C0                   NC_ERRS = NC_ERRS + 1;
 279    1    1        552.000                   CALL ERROR('LOCAL RELATION NAME APPEARING IN '
                      553.0C0                             ||'TARGET LIST SHOULD NOT BE '
                      554.000                             ||'QUANTIFIED');
 280    1    1        555.000                   PUT SKIP;
 281    1    1        556.CC0                   GCTO L7;
 282    1    1        557.000                  END;
 283    1             558.0C0            IF ST_TAB=HOLD_VAL
 284    1             559.000             THEN DO;
                      560.000                   /*  CHECK THAT A SINGLE DATA BASE RELATICN IS
                      561.000                       ONLY SPECIFIED IN TARGET LIST OF
                      562.000                       HOLD STATEMENT  */
 285    1    1        563.000                   DO I=1 TO NC_HTV;
 286    1    2        564.000                     IF HT_TAB.LRNAME(I)¬=ID_PSN
 287    1    2        565.000                      THEN DO;
 288    1    3        566.000                            SER_FLG = '1'B;
 289    1    3        567.000                            NO_ERRS = NO_ERRS + 1;
 290    1    3        568.000                            CALL ERROR('THE TARGET LIST OF A HOLD '
                      569.000                                      ||'STATEMENT MAY CNLY '
                      570.000                                      ||'SPECIFY A SINGLE DATA '
                      571.000                                      ||'BASE RELATICN');
 291    1    3        572.000                            PUT SKIP;
 292    1    3        573.C00                            GOTC L7;
 293    1    3        574.000                           END;
 294    1    2        575.000                   END;
                      576.000                   /*  FILL IN LOCAL RELATICN NAME IN HT_TAB  */
 295    1    1        577.000                   NO_HTV = NO_HTV + 1;
 296    1    1        578.000                   IF NO_HTV>MAX_HTV
 297    1    1        579.C00                    THEN DO;
 298    1    2        580.000                           SER_FLG = '1'B;
 299    1    2        581.C00                           NO_ERRS = NO_ERRS + 1;
 300    1    2        582.000                           CALL ERROR('IMPLEMENTATION RESTRICTION -'
                      583.000                                     ||' TOO MANY TARGET ELEMENTS'
                      584.C00                                     ||' SPECIFIED IN TARGET '
                      585.000                                     ||'LIST');
 301    1    2        586.000                           PUT SKIP;
 302    1    2        587.000                          END;
 303    1    1        588.000                    ELSE HT_TAB.LRNAME(NO_HTV) = ID_PSN;
 304    1    1        589.C00                  END;
 305    1             590.000             ELSE DO;
                      591.000                   /*  FILL IN LOCAL RELATION NAME IN GT_TAB  */
 306    1    1        592.000                   NO_GTV = NO_GTV + 1;
 307    1    1        593.000                   IF NO_GTV>MAX_GTV
 308    1    1        594.000                    THEN DO;
 309    1    2        595.C00                           SER_FLG = '1'B;
 310    1    2        596.000                           NO_ERRS = NO_ERRS + 1;
```

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 311    1    2                           CALL ERROR('IMPLEMENTATION RESTRICTION -'
                                                   ||' TOO MANY TARGET ELEMENTS'
                                                   ||' SPECIFIED IN TARGET '
                                                   ||'LIST');
 312    1    2                           PUT SKIP;
 313    1    2                          END;
 314    1    1                     ELSE GT_TAB.LRNAME(NO_GTV) = ID_PSN;
 315    1    1                    END;
 316    1                   L7 : RETURN;

 317    1           ROUTINE(12):
                            /*  FILL IN ATTRIBUTE NAME IN GT_TAB  */
                            GT_TAB.ANAME(NO_GTV) = ID_PSN;
 318    1                   RETURN;

 319    1           ROUTINE(13):
                            /*  CHECK FOR SPECIFICATION OF ONLY ONE RELATION NAME
                                IN RANGE STATEMENTS FOR IMAGE FUNCTION DESIGNATOR
                                IN TARGET LIST  */
                            IF MOD(STACK(STK_PTR),100)=IFN_VAL
 320    1                    THEN DO;
 321    1    1                    DO K=2 TO NO_RV;
 322    1    2                     IF RA_TAB.RNAME(K)¬=RA_TAB.RNAME(1)
 323    1    2                      THEN DO;
 324    1    3                            SER_FLG = '1'B;
 325    1    3                            NO_ERRS = NO_ERRS + 1;
 326    1    3                            CALL ERROR('IMAGE FUNCTION DETECTED - '
                                                   ||'ONE RELATION NAME CAN '
                                                   ||'ONLY BE SPECIFIED IN '
                                                   ||'RANGE STATEMENTS');
 327    1    3                            PUT SKIP;
 328    1    3                            GOTO L1;
 329    1    3                           END;
 330    1    2                     END;
 331    1    1                    END;
                            /*  FILL IN FUNCTION/IMAGE FUNCTION IDENTIFIER
                                IN GT_TAB  */
 332    1                   FUNCT = '1'B;
 333    1                   FUNCT_PSN = NO_GTV + 1;
 334    1                   GT_TAB.FUNCT(FUNCT_PSN) = STACK(STK_PTR);
 335    1                   L1 : RETURN;

 336    1           ROUTINE(14):
                            AL_PTR = AL_PTR + 1;
                            /*  CHECK FOR CONSISTENCY OF ATTRIBUTES SPECIFIED  */
 337    1                   IF ID_PSN¬=GT_TAB.ANAME(AL_PTR)
 338    1                    THEN DO;
 339    1    1                    SER_FLG = '1'B;
 340    1    1                    NC_ERRS = NC_ERRS + 1;
 341    1    1                    CALL ERROR('ATTRIBUTE LIST SPECIFIED NOT '
                                           ||'CONSISTENT');
 342    1    1                    PUT SKIP;
 343    1    1                   END;
```

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344     1           651.000     IF AL_PTR>=FUNCT_PSN
345     1           652.000      THEN DO;
346     1     1     653.000            SER_FLG = '1'B;
347     1     1     654.000            NO_ERRS = NO_ERRS + 1;
348     1     1     655.000            CALL ERROR('MORE ATTRIBUTES SPECIFIED IN '
                    656.000                       ||'ATTRIBUTE LIST OF IMAGE-FUNCTION'
                    657.000                       ||' ARGUMENT');
349     1     1     658.000            PUT SKIP;
350     1     1     659.000           END;
351     1           660.000      ELSE DO;
                    661.000            /*  FILL IN ATTRIBUTE LIST OF IMAGE-FUNCTION
                    662.000                ARGUMENT IN GT_TAB  */
352     1     1     663.000            IF NO_GTV>MAX_GTV
353     1     1     664.000             THEN DO;
354     1     2     665.000                   SER_FLG = '1'B;
355     1     2     666.000                   NO_ERRS = NO_ERRS + 1;
356     1     2     667.000                   CALL ERROR('IMPLEMENTATION RESTRICTION -'
                    668.000                              ||' TOO MANY TARGET ELEMENTS'
                    669.000                              ||' SPECIFIED IN TARGET '
                    670.000                              ||'LIST');
357     1     2     671.000                   PUT SKIP;
358     1     2     672.000                  END;
359     1     1     673.000             ELSE DO;
360     1     2     674.000                   GT_TAB.ALIST(NO_GTV) = ID_PSN;
361     1     2     675.000                   GT_TAB.ALISTPTR(NO_GTV) = NO_GTV + 1;
362     1     2     676.000                   NO_GTV = NO_GTV + 1;
363     1     2     677.000                  END;
364     1     1     678.000           END;
365     1           679.000      RETURN;
                    680.000
366     1           681.000 ROUTINE(15):
                    682.000      IF AL_PTR<FUNCT_PSN-1
367     1           683.000       THEN DO;
368     1     1     684.000             SER_FLG = '1'B;
369     1     1     685.000             NO_ERRS = NO_ERRS + 1;
370     1     1     686.000             CALL ERROR('LESS ATTRIBUTES SPECIFIED IN '
                    687.000                        ||'ATTRIBUTE LIST OF IMAGE-FUNCTION'
                    688.000                        ||' ARGUMENT');
371     1     1     689.000             PUT SKIP;
372     1     1     690.000            END;
373     1           691.000       ELSE DO;
                    692.000             /*  SET ATTRIBUTE LIST POINTER TO ZERO  */
374     1     1     693.000             NO_GTV = NO_GTV - 1;
375     1     1     694.000             GT_TAB.ALISTPTR(NO_GTV) = 0;
376     1     1     695.000             AL_PTR = 0;
377     1     1     696.000            END;
378     1           697.000      RETURN;
                    698.000
379     1           699.000 ROUTINE(16):
                    700.000      /*  FILL IN ATTRIBUTE NAME OF IMAGE-FUNCTION
                    701.000          ARGUMENT  */
                    702.000      GT_TAB.ANAME(FUNCT_PSN) = ID_PSN;
380     1           703.000      RETURN;
                    704.000
```

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381     1          705.000        ROUTINE(17):
                   706.000              /*  CHECK FOR CONSISTENCY OF LOCAL RELATION NAME
                   707.000                  USED  */
                   708.000              DO I=1 TO NO_GTV;
382     1     1    709.000               IF ID_PSN¬=GT_TAB.LRNAME(I)
383     1     1    710.000                THEN DO;
384     1     2    711.000                      SER_FLG = '1'B;
385     1     2    712.000                      NO_ERRS = NO_ERRS + 1;
386     1     2    713.000                      CALL ERROR('LOCAL RELATION NAME SPECIFIED NOT '
                   714.000                                 ||'CONSISTENT');
387     1     2    715.000                      PUT SKIP;
388     1     2    716.000                      GOTO L2;
389     1     2    717.000                     END;
390     1     1    718.000              END;
                   719.000              /*  FILL IN LOCAL RELATION NAME OF IMAGE-FUNCTION
                   720.000                  ARGUMENT IN GT_TAB  */
391     1          721.000              NO_GTV = NO_GTV + 1;
392     1          722.000              GT_TAB.LRNAME(NO_GTV) = ID_PSN;
393     1          723.000              L2 :  RETURN;
                   724.000
394     1          725.000        ROUTINE(18):
                   726.000              /*  MOVE NEWLY-ALLOCATED WORKSPACE NAME INTO
                   727.000                  WORKSPACE TABLE FOR GET/HOLD STATEMENT  */
                   728.000              IF IDENTS.IDENT_VAL(WN_TAB)¬=WS_VAL & WN_TAB¬=0
395     1          729.000               THEN DO;
396     1     1    730.000                     NO_WS = NO_WS + 1;
397     1     1    731.000                     IDENTS.IDENT_NAME(NO_WS) = IDENT_NAME(WN_TAB);
398     1     1    732.000                     IDENTS.IDENT_VAL(NO_WS) = WS_VAL;
399     1     1    733.000                     IDENTS.INF_FLD(NO_WS) = 0;
400     1     1    734.000                     WN_TAB = NO_WS;
401     1     1    735.000                    END;
402     1          736.000              IF ST_TAB=HOLD_VAL
403     1          737.000               THEN DO;
404     1     1    738.000                     HOLD_WS = '1'B;
405     1     1    739.000                     UDWS_PSN = WN_TAB;
406     1     1    740.000                    END;
407     1          741.000              GOTO ROUTINE(1);
408     1          742.000              RETURN;
                   743.000
409     1          744.000        ROUTINE(19):
                   745.000              /*  CHECK THAT STANDARD FUNCTION IS NOT USED IN
                   746.000                  TARGET LIST  */
                   747.000              IF FUNCT
410     1          748.000               THEN DO;
411     1     1    749.000                     SER_FLG = '1'B;
412     1     1    750.000                     NO_ERRS = NO_ERRS + 1;
413     1     1    751.000                     CALL ERROR('INVALID USE OF IMAGE '
                   752.000                                ||'FUNCTION DESIGNATOR');
414     1     1    753.000                     PUT SKIP;
415     1     1    754.000                    END;
                   755.000              /*  CHECK THAT ONLY ONE RANGE STATEMENT IS DECLARED */
416     1          756.000              IF NO_RV¬=1
417     1          757.000               THEN DO;
418     1     1    758.000                     SER_FLG = '1'B;
```

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 419   1   1                     NO_ERRS = NO_ERRS + 1;
 420   1   1                     CALL ERROR('IMAGE FUNCTION IDENTIFIER DETECTED '
                                             ||'- ONLY ONE RANGE STATEMENT '
                                             ||'PERMITTED');
 421   1   1                     PUT SKIP;
 422   1   1                    END;
 423   1                   ELSE DO;
                                 /* FILL IN IMAGE FUNCTION IDENTIFIER
                                    IN FT_MT_TAB  */
 424   1   1                     NO_MT = NO_MT + 1;
 425   1   1                     FN_MT_TAB.FUNCT(NO_MT) = STACK(STK_PTR);
 426   1   1                    END;
 427   1                  RETURN;

 428   1           ROUTINE(20):
                          /*  CHECK THAT STANDARD FUNCTION IS NOT USED IN
                              TARGET LIST  */
                          IF FUNCT
 429   1                   THEN DO;
 430   1   1                     SER_FLG = '1'B;
 431   1   1                     NO_ERRS = NO_ERRS + 1;
 432   1   1                     CALL ERROR('INVALID USE OF BOOLEAN '
                                             ||'FUNCTION DESIGNATOR');
 433   1   1                     PUT SKIP;
 434   1   1                    END;
                          /*  CHECK THAT ONLY ONE RANGE STATEMENT IS DECLARED */
 435   1                  IF NO_RV¬=1
 436   1                   THEN DO;
 437   1   1                     SER_FLG = '1'B;
 438   1   1                     NO_ERRS = NO_ERRS + 1;
 439   1   1                     CALL ERROR('BOOLEAN FUNCTION IDENTIFIER '
                                             ||'DETECTED - ONLY ONE RANGE '
                                             ||'STATEMENT PERMITTED');
 440   1   1                     PUT SKIP;
 441   1   1                    END;
 442   1                  RETURN;

 443   1           ROUTINE(21):
                          /*  CHECK FOR CORRECT SPECIFICATION OF LOCAL RELATION
                              NAME  */
                          DO I=1 TO NO_GTV;
 444   1   1               IF ID_PSN=GT_TAB.LRNAME(I)
 445   1   1                THEN GOTO L12;
 446   1   1              END;
 447   1                  DO I=1 TO NO_HTV;
 448   1   1               IF ID_PSN=HT_TAB.LRNAME(I)
 449   1   1                THEN GOTO L12;
 450   1   1              END;
 451   1                  IF LRN_TAB=ID_PSN
 452   1                   THEN GOTO L12;
 453   1                  IF IDENTS.INF_FLD(ID_PSN)=0
 454   1                   THEN DO;
 455   1   1                     SER_FLG = '1'B;
 456   1   1                     NO_ERRS = NO_ERRS + 1;
```

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457     1    1                  CALL ERROR('LOCAL RELATION NAME APPPEARING IN '
                                             ||'QUALIFICATION AND NOT IN THE '
                                             ||'TARGET LIST MUST BE QUANTIFIED');
458     1    1                  GOTO L13;
459     1    1                 END;
                      /*  FILL IN W COMPCNENT IN RA_TAB   */
460     1             L12 : IF FPL_PTR=82 | FPL_PTR=88
461     1                   THEN GOTO L13;
462     1                  CALL SC_RATAB(ID_PSN);
463     1             L13 : RETURN;

464     1         ROUTINE(22):
                      /*  STORE CERTAIN VALUES   */
                      SEM1 = OID_PSN;
465     1             SEM2 = ID_PSN;
466     1             RETURN;

467     1         ROUTINE(23):
                      /*  FILL IN MONADIC TERM IN FN_MT_TAB   */
                      NO_MT = NO_MT + 1;
468     1             IF NC_MT>MAX_MT
469     1              THEN DO;
470     1    1              SER_FLG = '1'B;
471     1    1              NC_ERRS = NC_ERRS + 1;
472     1    1              CALL ERROR('IMPLEMENTATION RESTRICTION -'
                                      ||' TOO MANY MONADIC '
                                      ||'TERMS SPECIFIED');
473     1    1              PUT SKIP;
474     1    1              GOTO L6;
475     1    1             END;
476     1             FN_MT_TAB.LRNAME(NC_MT) = SEM1;
477     1             I = 1;
478     1             DO WHILE(RA_TAB.LRNAME(I)¬=SEM1);
479     1    1          I = I + 1;
480     1    1        END;
481     1             FN_MT_TAB.RNAME(NO_MT)  = RA_TAB.RNAME(I);
482     1             FN_MT_TAB.ANAME(NO_MT)  = SEM2;
483     1             FN_MT_TAB.RELOP(NO_MT)  = STACK(STK_PTR-1);
484     1             FN_MT_TAB.WCOMP(NO_MT)  = C_WCOMP;
485     1             FN_MT_TAB.TCOMP(NO_MT)  = C_TCOMP;

486     1             IF STACK(STK_PTR)=INT_VAL
487     1              THEN DO;
488     1    1              FN_MT_TAB.CCNPTR(NO_MT) = IFB_PSN(FXD);
489     1    1              FN_MT_TAB.CCNTYPE(NO_MT) = INT_TYPE;
490     1    1             END;
491     1              ELSE
491     1              IF STACK(STK_PTR)=RNO_VAL
492     1               THEN DO;
493     1    1               FN_MT_TAB.CCNPTR(NO_MT) = IFLT_PSN(FLT);
494     1    1               FN_MT_TAB.CONTYPE(NO_MT) = RNO_TYPE;
495     1    1              END;
496     1               ELSE DO;
497     1    1               FN_MT_TAB.CONPTR(NO_MT) = ICH_PSN(STRING);
```

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498   1   1          FN_MT_TAB.CCNTYPE(NO_MT) = CH_TYPE;
499   1   1          FN_MT_TAB.CONLEN(NO_MT) = LENGTH(STRING);
500   1   1         END;
501   1          L6 : RETURN;

502   1       ROUTINE(24):
             /*  FILL IN DYADIC JOIN TERM IN DT_TAB/DTOV_TAB  */
             IF OID_PSN¬=SEM1
503   1       THEN DO;
                   /*  DYADIC JOIN TERM DETECTED  */
504   1   1        NO_DT = NO_CT + 1;
505   1   1        IF NO_DT>MAX_DT
506   1   1         THEN DO;
507   1   2               SER_FLG = '1'B;
508   1   2               NO_ERRS = NO_ERRS + 1;
509   1   2               CALL ERROR('IMPLEMENTATION RESTRICTION -'
                                    ||' TOO MANY CYDAIC JCIN '
                                    ||'TERMS SPECIFIED');
510   1   2               PUT SKIP;
511   1   2               GOTO L4;
512   1   2              END;
513   1   1        DT_TAB.LRNAME1(NO_DT) = SEM1;
514   1   1        DT_TAB.ANAME1(NO_DT) = SEM2;
515   1   1        DT_TAB.LRNAME2(NO_DT) = OID_PSN;
516   1   1        DT_TAB.ANAME2(NO_DT) = ID_PSN;
517   1   1        DT_TAB.RELOP(NO_DT) = STACK(STK_PTR-3);
518   1   1        DT_TAB.WCCMP(NO_DT) = C_WCCMP;
519   1   1        DT_TAB.TCOMP(NO_DT) = C_TCOMP;
520   1   1       END;
521   1       ELSE DO;
                   /*  DYADIC JOIN TERM IN ONE VARIABLE DETECTED */
522   1   1        NC_DTOV = NC_CTOV + 1;
523   1   1        IF NO_DTOV>MAX_DTOV
524   1   1         THEN DC;
525   1   2               SER_FLG = '1'B;
526   1   2               NO_ERRS = NO_ERRS + 1;
527   1   2               CALL ERROR('IMPLEMENTATION RESTRICTION -'
                                    ||' TOO MANY DYDAIC JCIN '
                                    ||'TERMS IN ONE '
                                    ||'VARIABLE SPECIFIED');
528   1   2               PUT SKIP;
529   1   2               GOTO L4;
530   1   2              END;
531   1   1        DTOV_TAB.LRNAME(NO_DTOV) = SEM1;
532   1   1        DTOV_TAB.ANAME1(NO_DTOV) = SEM2;
533   1   1        DTOV_TAB.ANAME2(NC_DTOV) = ID_PSN;
534   1   1        DTOV_TAB.RELOP(NO_DTOV) = STACK(STK_PTR-3);
535   1   1        DTOV_TAB.WCCMP(NO_DTOV) = C_WCOMP;
536   1   1        DTOV_TAB.TCCMP(NO_DTOV) = C_TCCMP;
537   1   1        I = 1;
538   1   1        DO WHILE(RA_TAB.LRNAME(I)¬=SEM1);
539   1   2         I = I + 1;
540   1   2        END;
541   1   1        DTOV_TAB.RNAME(NO_DTOV) = RA_TAB.RNAME(I);
```

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542    1    1                   END;
543    1                   L4 :  RETURN;

544    1            ROUTINE(25):
                           IF AL_PTR<NO_GTV
545    1                    THEN DO;
546    1    1                      SER_FLG = '1'B;
547    1    1                      NC_ERRS = NC_ERRS + 1;
548    1    1                      CALL ERROR('LESS ATTRIBUTES SPECIFIED IN '
                                                 ||'ATTRIBUTE LIST OF IMAGE FUNCTION'
                                                 ||' ARGUMENT');
549    1    1                      PUT SKIP;
550    1    1                     END;
551    1                    ELSE DO;
                                   /*  SET ATTRIBUTE LIST POINTER TC ZERO  */
552    1    1                      NC_MT = NO_MT - 1;
553    1    1                      FN_MT_TAB.ALISTPTR(NO_MT) = 0;
554    1    1                      AL_PTR = 0;
555    1    1                     END;
556    1                    RETURN;

557    1            ROUTINE(26):
                           /*  FILL IN ATTRIBUTE NAME OF IMAGE-FUNCTION
                               ARGUMENT IN FN_MT_TAB  */
                           FN_MT_TAB.ANAME(1) = ID_PSN;
558    1                   RETURN;

559    1            ROUTINE(27):
                           /*  FILL IN RELATICNAL CPERATOR AND NUMBER OF
                               IMAGE FUNCTION DESIGNATOR IN FN_MT_TAB  */
                           IF STACK(STK_PTR-4)=ICNT_VAL &
                              (STACK(STK_PTR)¬=INT_VAL | STACK(STK_PTR-1)=NEG_VAL)
560    1                    THEN DO;
561    1    1                      SER_FLG = '1'B;
562    1    1                      NC_ERRS = NO_ERRS + 1;
563    1    1                      CALL ERROR('IMAGE FUNCTION(ICOUNT) APPLICABLE '
                                                 ||'CNLY TO POSITIVE INTEGER '
                                                 ||'CONSTANT');
564    1    1                      PUT SKIP;
565    1    1                     END;
566    1                    ELSE DO;
567    1    1                      FN_MT_TAB.RELOP(1) = STACK(STK_PTR-1);
568    1    1                      IF STACK(STK_PTR)=INT_VAL
569    1    1                       THEN DO;
570    1    2                              FN_MT_TAB.CCNPTR(1) = IFB_PSN(FXD);
571    1    2                              FN_MT_TAB.CONTYPE(1) = INT_TYPE;
572    1    2                             END;
573    1    1                       ELSE DO;
574    1    2                              FN_MT_TAB.CONPTR(1) = IFLT_PSN(FLT);
575    1    2                              FN_MT_TAB.CONTYPE(1) = RNO_TYPE;
576    1    2                             END;
577    1    1                     END;
578    1                    RETURN;
```

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579     1           975.000     ROUTINE(28):
                    976.000           /*  INCREMENT THETA COMPONENT BY 1  */
                    977.000           C_TCOMP = C_TCOMP + 1;
580     1           978.000           RETURN;
                    979.000
581     1           980.000     ROUTINE(29):
                    981.000           /*  INCREMENT W COMPONENT BY 1 AND
                    982.000               SET THETA COMPONENT TO 1  */
                    983.000           C_WCOMP = C_WCOMP + 1;
582     1           984.000           C_TCOMP = 1;
                    985.000           /*  SET CERTAIN VALUES  */
583     1           986.000           WPSTK_PTR = WPSTK_PTR + 1;
584     1           987.000           WP_STK(WPSTK_PTR) = C_WCOMP;
585     1           988.000           RETURN;
                    989.000
586     1           990.000     ROUTINE(30):
                    991.000           /*  FILL IN W COMPONENT PRECEDENCE  */
                    992.000           NO_WPV = NO_WPV + 1;
587     1           993.000           IF NO_WPV>MAX_WPV
588     1           994.000            THEN DO;
589     1     1     995.000                  SER_FLG = '1'B;
590     1     1     996.000                  NO_ERRS = NO_ERRS + 1;
591     1     1     997.000                  CALL ERROR('IMPLEMENTATION RESTRICTION - TOO '
                    998.000                             ||'MANY WORK COMPONENTS SPECIFIED');
592     1     1     999.000                  PUT SKIP;
593     1     1    1000.000                 END;
594     1          1001.000            ELSE DO;
595     1     1    1002.000                  WP_TAB.WCOMP1(NO_WPV) = WP_STK(WPSTK_PTR-1);
596     1     1    1003.000                  WP_TAB.WCOMP2(NO_WPV) = WP_STK(WPSTK_PTR);
597     1     1    1004.000                  WP_TAB.OPER(NO_WPV) = STACK(STK_PTR);
598     1     1    1005.000                  WPSTK_PTR = WPSTK_PTR - 1;
599     1     1    1006.000                  WP_STK(WPSTK_PTR) = - NO_WPV;
600     1     1    1007.000                 END;
601     1          1008.000           RETURN;
                    1009.000
602     1          1010.000     ROUTINE(31):
                    1011.000           /*  FILL IN RELATION NAME IN RN_TAB
                    1012.000               FOR DROP/NEW STATEMENT  */
                    1013.000           RN_TAB = ID_PSN;
603     1          1014.000           RETURN;
                    1015.000
604     1          1016.000     ROUTINE(32):
                    1017.000           AL_PTR = AL_PTR + 1;
                    1018.000           /*  CHECK FOR CONSISTENCY OF ATTRIBUTES SPECIFIED  */
605     1          1019.000           IF (ST_TAB=GET_VAL & ID_PSN¬=GT_TAB.ANAME(AL_PTR)) |
                    1020.000              (ST_TAB=HOLD_VAL & ID_PSN¬=HT_TAB.ANAME(AL_PTR))
606     1          1021.000            THEN DO;
607     1     1    1022.000                  SER_FLG = '1'B;
608     1     1    1023.000                  NO_ERRS = NO_ERRS + 1;
609     1     1    1024.000                  CALL ERROR('ATTRIBUTE LIST SPECIFIED NOT '
                    1025.000                             ||'CONSISTENT');
610     1     1    1026.000                  PUT SKIP;
611     1     1    1027.000                 END;
                    1028.000
```

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612     1          1029.000      IF (ST_TAB=GET_VAL & AL_PTR>NO_GTV) |
                   1030.000         (ST_TAB=HOLD_VAL & AL_PTR>NO_HTV)
613     1          1031.000       THEN DO;
614     1     1    1032.000            SER_FLG='1'B;
615     1     1    1033.000            NC_ERRS = NC_ERRS + 1;
616     1     1    1034.000            CALL ERROR('MORE ATTRIBUTES SPECIFIED IN '
                   1035.000                       ||'ATTRIBUTE LIST OF IMAGE FUNCTION'
                   1036.000                       ||' ARGUMENT');
617     1     1    1037.000            PUT SKIP;
618     1     1    1038.000           END;
619     1          1039.000       ELSE DO;
                   1040.000            /*  FILL IN ATTRIBUTE LIST OF IMAGE FUNCTION
                   1041.000                RESULT IN FN_MT_TAB  */
620     1     1    1042.000            IF NO_MT>MAX_MT
621     1     1    1043.000             THEN DO;
622     1     2    1044.000                   SER_FLG = '1'B;
623     1     2    1045.000                   NO_ERRS = NO_ERRS + 1;
624     1     2    1046.000                   CALL ERROR('IMPLEMENTATION RESTRICTION -'
                   1047.000                              ||' TOO MANY ATTRIBUTES '
                   1048.000                              ||'SPECIFIED IN IMAGE '
                   1049.000                              ||'FUNCTION ARGUMENT');
625     1     2    1050.000                   PUT SKIP;
626     1     2    1051.000                  END;
627     1     1    1052.000             ELSE DO;
628     1     2    1053.000                   FN_MT_TAB.ALIST(NO_MT) = ID_PSN;
629     1     2    1054.000                   FN_MT_TAB.ALISTPTR(NO_MT) = NO_MT +1;
630     1     2    1055.000                   NO_MT = NO_MT + 1;
631     1     2    1056.000                  END;
632     1     1    1057.000              END;
633     1          1058.000        RETURN;
                   1059.000
634     1          1060.000  ROUTINE(33):
                   1061.000        /*  BOOLEAN FUNCTION DESIGNATOR DETECTED  */
                   1062.000        IF STACK(STK_PTR-4)¬=INT_VAL
635     1          1063.000         THEN DO;
636     1     1    1064.000               SER_FLG = '1'B;
637     1     1    1065.000               NC_ERRS = NC_ERRS + 1;
638     1     1    1066.000               CALL ERROR('REAL NUMBER SPECIFIED IN BOOLEAN '
                   1067.000                          ||'FUNCTION ARGUMENT');
639     1     1    1068.000               PUT SKIP;
640     1     1    1069.000              END;
641     1          1070.000         ELSE DO;
                   1071.000               /*  FILL IN BOOLEAN FUNCTION DESIGNATOR
                   1072.000                   IN FN_MT_TAB  */
642     1     1    1073.000               NO_MT = NO_MT + 1;
643     1     1    1074.000               FN_MT_TAB.FUNCT(NO_MT) = STACK(STK_PTR-6);
644     1     1    1075.000               FN_MT_TAB.LRNAME(NO_MT) = OID_PSN;
645     1     1    1076.000               I = 1;
646     1     1    1077.000               DO WHILE(RA_TAB.LRNAME(I)¬=OID_PSN);
647     1     2    1078.000                I = I + 1;
648     1     2    1079.000               END;
649     1     1    1080.000               FN_MT_TAB.RNAME(NO_MT) = RA_TAB.RNAME(I);
650     1     1    1081.000               FN_MT_TAB.ANAME(NO_MT) = ID_PSN;
651     1     1    1082.000               FN_MT_TAB.CONPTR(NO_MT) = IFB_PSN(FXD);
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652      1     1      1083.000                  FN_MT_TAB.CONTYPE(NO_MT) = INT_TYPE;
653      1     1      1084.000                 END;
654      1            1085.000            RETURN;
                      1086.000
655      1            1087.000      ROUTINE(34):
                      1088.000            /*  FILL IN ELEMENT ORDERING EXPRESSION IN OR_TAB
                      1089.000                FOR GET/HOLD STATEMENT  */
                      1090.000            DO I=1 TO NO_GTV;
656      1     1      1091.000             IF CID_PSN=GT_TAB.LRNAME(I)
657      1     1      1092.000              THEN GOTO L5;
658      1     1      1093.000            END;
659      1            1094.000            DO I=1 TO NO_HTV;
660      1     1      1095.000             IF OID_PSN=HT_TAB.LRNAME(I)
661      1     1      1096.000              THEN GOTO L5;
662      1     1      1097.000            END;
663      1            1098.000            SER_FLG = '1'B;
664      1            1099.000            NO_ERRS = NO_ERRS + 1;
665      1            1100.000            CALL ERROR('LOCAL RELATION NAME APPEARING IN ELEMENT '
                      1101.000                       ||'ORDERING EXPRESSION NOT SPECIFIED IN '
                      1102.000                       ||'TARGET LIST');
666      1            1103.000            PUT SKIP;
667      1            1104.000            GOTO L8;
668      1            1105.000        L5: NO_OV = NO_OV + 1;
669      1            1106.000            IF NO_OV>MAX_OV
670      1            1107.000             THEN DO;
671      1     1      1108.000                   SER_FLG = '1'B;
672      1     1      1109.000                   NO_ERRS = NO_ERRS + 1;
673      1     1      1110.000                   CALL ERROR('IMPLEMENTATION RESTRICTION - TOO '
                      1111.000                              ||'MANY ELEMENT ORDERING '
                      1112.000                              ||'EXPRESSIONS USED');
674      1     1      1113.000                   PUT SKIP;
675      1     1      1114.000                  END;
676      1            1115.000             ELSE DO;
677      1     1      1116.000                   OR_TAB.ORDER(NO_OV) = STACK(STK_PTR-2);
678      1     1      1117.000                   OR_TAB.LRNAME(NO_OV) = OID_PSN;
679      1     1      1118.000                   OR_TAB.ANAME(NO_OV) = ID_PSN;
680      1     1      1119.000                  END;
681      1            1120.000           L8 : RETURN;
                      1121.000
682      1            1122.000      ROUTINE(35):
                      1123.000            /*  FILL IN LOCAL RELATION NAME OF IMAGE FUNCTION
                      1124.000                ARGUMENT IN FN_MT_TAB  */
                      1125.000            FN_MT_TAB.LRNAME(NO_MT) = ID_PSN;
683      1            1126.000            I = 1;
684      1            1127.000            DO WHILE(RA_TAB.LRNAME(I)¬=ID_PSN);
685      1     1      1128.000             I = I + 1;
686      1     1      1129.000            END;
687      1            1130.000            FN_MT_TAB.RNAME(NO_MT) = RA_TAB.RNAME(I);
688      1            1131.000            RETURN;
                      1132.000
689      1            1133.000      ROUTINE(36):
                      1134.000            /*  FILL IN ATTRIBUTE NAME IN HT_TAB  */
                      1135.000            HT_TAB.ANAME(NO_HTV) = ID_PSN;
690      1            1136.000            RETURN;
```

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                        1137.000
691      1              1138.000   ROUTINE(37):
                        1139.000         /*  FILL IN WN_TAB,RN_TAB FOR PUT STATEMENT  */
                        1140.000         WN_TAB = OID_PSN;
692      1              1141.000         RN_TAB = ID_PSN;
693      1              1142.000         RETURN;
                        1143.000
694      1              1144.000   ROUTINE(38):
                        1145.000         /*  FILL IN ATTRIBUTE LIST IN AL_TAB  */
                        1146.000         NO_ALV = NO_ALV + 1;
695      1              1147.000         IF NO_ALV>MAX_ALV
696      1              1148.000          THEN DO;
697      1    1         1149.000                SER_FLG = '1'B;
698      1    1         1150.000                NO_ERRS = NO_ERRS + 1;
699      1    1         1151.000                CALL ERROR('IMPLEMENTATION RESTRICTION - TOO '
                        1152.000                          ||'MANY ATTRIBUTES SPECIFIED');
700      1    1         1153.000                PUT SKIP;
701      1    1         1154.000               END;
702      1              1155.000          ELSE AL_TAB(NO_ALV) = ID_PSN;
703      1              1156.000         RETURN;
                        1157.000
704      1              1158.000   ROUTINE(39):
                        1159.000         /*  FILL IN ELEMENT ORDERING EXPRESSION IN OR_TAB
                        1160.000             FOR PUT STATEMENT  */
                        1161.000         DO I=1 TO NO_ALV;
705      1    1         1162.000          IF ID_PSN=AL_TAB(I)
706      1    1         1163.000           THEN GOTO L10;
707      1    1         1164.000         END;
708      1              1165.000         SER_FLG = '1'B;
709      1              1166.000         NO_ERRS = NO_ERRS + 1;
710      1              1167.000         CALL ERROR('LOCAL RELATION NAME APPEARING IN ELEMENT '
                        1168.000                    ||'ORDERING NOT SPECIFIED IN ATTRIBUTE '
                        1169.000                    ||'LIST');
711      1              1170.000         PUT SKIP;
712      1              1171.000         GOTO L11;
713      1              1172.000   L10 : NO_OV = NO_OV + 1;
714      1              1173.000         IF NO_OV>MAX_OV
715      1              1174.000          THEN DO;
716      1    1         1175.000                SER_FLG = '1'B;
717      1    1         1176.000                NO_ERRS = NO_ERRS + 1;
718      1    1         1177.000                CALL ERROR('IMPLEMENTATION RESTRICTION - TOO '
                        1178.000                          ||'MANY ELEMENT ORDERING '
                        1179.000                          ||'EXPRESSIONS USED');
719      1    1         1180.000                PUT SKIP;
720      1    1         1181.000               END;
721      1              1182.000          ELSE DO;
722      1    1         1183.000                OR_TAB.ORDER(NO_OV) = STACK(STK_PTR);
723      1    1         1184.000                OR_TAB.ANAME(NO_OV) = ID_PSN;
724      1    1         1185.000               END;
725      1              1186.000         L11 : RETURN;
                        1187.000
726      1              1188.000   ROUTINE(40):
                        1189.000         /*  FILL IN ATTRIBUTE NAME, KEY TYPE IN ATT_TAB  */
                        1190.000         NO_ATT = NO_ATT + 1;
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727     1          1191.000          IF NO_ATT>MAX_ATT
728     1          1192.000           THEN DO;
729     1     1    1193.000                 SER_FLG = '1'B;
730     1     1    1194.000                 NO_ERRS = NO_ERRS + 1;
731     1     1    1195.000                 CALL ERROR('IMPLEMENTATION RESTRICTION - TOO '
                   1196.000                           ||'MANY ATTRIBUTES DECLARED');
732     1     1    1197.000                 PUT SKIP;
733     1     1    1198.000                END;
734     1          1199.000           ELSE ATT_TAB.ANAME(NO_ATT) = ID_PSN;
735     1          1200.000          RETURN;
                   1201.000
736     1          1202.000     ROUTINE(41):
                   1203.000          /*  FILL IN ATTRIBUTE TYPE IN ATT_TAB  */
                   1204.000          IF STACK(STK_PTR)/100>CH_TYPE & LEX_VAL=CBR_VAL
737     1          1205.000           THEN DO;
738     1     1    1206.000                 SER_FLG = '1'B;
739     1     1    1207.000                 NO_ERRS = NO_ERRS + 1;
740     1     1    1208.000                 CALL ERROR('ATTRIBUTE LENGTH NOT SPECIFIED FOR '
                   1209.000                           ||'CHARACTER STRING DECLARED');
741     1     1    1210.000                 PUT SKIP;
742     1     1    1211.000                END;
743     1          1212.000           ELSE ATT_TAB.ATYPE(NO_ATT) = STACK(STK_PTR)/100;
744     1          1213.000          RETURN;
                   1214.000
745     1          1215.000     ROUTINE(42):
                   1216.000          /*  CHECK THAT BOTH ATTRIBUTE TYPE AND
                   1217.000              ATTRIBUTE LENGTH ARE COMPATIBLE  */
                   1218.000          IF ATT_TAB.ATYPE(NC_ATT)<CH_TYPE
746     1          1219.000           THEN DO;
747     1     1    1220.000                 SER_FLG = '1'B;
748     1     1    1221.000                 NO_ERRS = NO_ERRS + 1;
749     1     1    1222.000                 CALL ERROR('ATTRIBUTE LENGTH SHOULD NOT BE '
                   1223.000                           ||'SPECIFIED FOR ATTRIBUTE TYPE '
                   1224.000                           ||'DECLARED');
750     1     1    1225.000                 PUT SKIP;
751     1     1    1226.000                END;
752     1          1227.000          IF STACK(STK_PTR)¬=INT_VAL
753     1          1228.000           THEN DO;
754     1     1    1229.000                 SER_FLG = '1'B;
755     1     1    1230.000                 NO_ERRS = NO_ERRS + 1;
756     1     1    1231.000                 CALL ERROR('ATTRIBUTE LENGTH SPECIFIED MUST BE '
                   1232.000                           ||'AN INTEGER CONSTANT');
757     1     1    1233.000                 PUT SKIP;
758     1     1    1234.000                END;
759     1          1235.000           ELSE ATT_TAB.ALEN(NO_ATT) = FXD;
760     1          1236.000          RETURN;
                   1237.000
761     1          1238.000     ROUTINE(43):
                   1239.000          IF LEX_VAL¬=EQ_VAL
762     1          1240.000           THEN DO;
763     1     1    1241.000                 SER_FLG = '1'B;
764     1     1    1242.000                 NO_ERRS = NO_ERRS + 1;
765     1     1    1243.000                 CALL ERROR('THE LEFT HAND SIDE OF AN '
                   1244.000                           ||'ASSIGNMENT STATEMENT MUST BE '
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                                             ||'FOLLOWED BY AN "=" SYMBCL');
766     1     1                     PUT SKIP;
767     1     1                    END;
768     1                      RETURN;

769     1                  ROUTINE(44):
                               /*  INPUT/OUTPUT STATEMENT DETECTED  */
                               IF ST_TAB=READ_VAL
770     1                       THEN DO;
771     1     1                      IF STACK(STK_PTR)=WS_VAL
772     1     1                       THEN DO;
773     1     2                            SER_FLG = '1'B;
774     1     2                            NO_ERRS = NO_ERRS + 1;
775     1     2                            CALL ERROR('INVALID SPECIFICATION CF A '
                                                  ||'WORKSPACE NAME IN READ '
                                                  ||'STATEMENT');
776     1     2                            PUT SKIP;
777     1     2                            GOTO L9;
778     1     2                           END;
779     1     1                      IF MOD(IDENT_VAL(ID_PSN),100)¬=VAR_VAL
780     1     1                       THEN DO;
781     1     2                            NO_NIDV = NO_NIDV + 1;
782     1     2                            IF NO_NIDV>END_VARS-NO_VARS
783     1     2                             THEN DO;
784     1     3                                 SER_FLG = '1'B;
785     1     3                                 NO_ERRS = NO_ERRS + 1 ;
786     1     3                                 CALL ERROR('IMPLEMENTATION '
                                                         ||'RESTRICTION - YCU'
                                                         ||' HAVE EXCEECED '
                                                         ||'THE NUMBER CF '
                                                         ||'VARIABLES '
                                                         ||'PERMITTED');
787     1     3                                 PUT SKIP;
788     1     3                                 GOTO L9;
789     1     3                                END;
790     1     2                           END;
791     1     1                      END;
                               /*  FILL IN ID_TAB FOR EACH IDENTIFIER
                                   ENCOUNTERED  */
792     1                      NO_IDV = NO_IDV + 1;
793     1                      IF NO_IDV>MAX_IDV
794     1                       THEN DO;
795     1     1                      SER_FLG = '1'B;
796     1     1                      NO_ERRS = NO_ERRS + 1;
797     1     1                      CALL ERROR('IMPLEMENTATION RESTRICTION - TOO '
                                             ||'MANY IDENTIFIERS SPECIFIEC '
                                             ||'IN READ/LIST STATEMENT');
798     1     1                      PUT SKIP;
799     1     1                     END;
800     1                       ELSE ID_TAB(NO_IDV) = ID_PSN;
801     1                      L9 : RETURN;

802     1                  ROUTINE(45):
                               /*  MOVE NEWLY-DECLARED VARIABLES INTO VARIABLE
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                    1299.000            TABLE FOR READ STATEMENT  */
                    1300.000          DO I=1 TO NO_IDV;
803      1     1    1301.000           IF MOD(IDENTS.IDENT_VAL(ID_TAB(I)),100)¬=VAR_VAL
804      1     1    1302.000            THEN DO;
805      1     2    1303.000                  NO_VARS = NO_VARS + 1;
806      1     2    1304.000                  IDENT_NAME(NO_VARS) = IDENT_NAME(ID_TAB(I));
807      1     2    1305.000                  IF SUBSTR(IDENT_NAME(ID_TAB(I)),1,1)>='I' &
                    1306.000                     SUBSTR(IDENT_NAME(ID_TAB(I)),1,1)<='C'
808      1     2    1307.000                   THEN IDENT_VAL(NO_VARS) = INT_VAR;
809      1     2    1308.000                   ELSE IDENT_VAL(NO_VARS) = RNO_VAR;
810      1     2    1309.000                  IDENTS.INF_FLG(NO_VARS) = 0;
811      1     2    1310.000                  ID_TAB(I) = NO_VARS;
812      1     2    1311.000                 END;
813      1     1    1312.000          END;
814      1          1313.000          RETURN;
                    1314.000
815      1          1315.000    ROUTINE(46):
                    1316.000          /*  FILL IN ASS_TAB FOR LEFT HAND SIDE
                    1317.000              OF ASSIGNMENT STATEMENT  */
                    1318.000          NO_ASSV = NO_ASSV + 1;
816      1          1319.000          ASS_TAB.OP1(NO_ASSV) = CID_PSN;
817      1          1320.000          ASS_TAB.IOP1(NO_ASSV) = OP_PTR;
818      1          1321.000          ASS_TAB.OP2(NO_ASSV) = ID_PSN;
819      1          1322.000          ASS_TAB.IOP2(NO_ASSV) = OP_PTR;
820      1          1323.000          ASS_TAB.OPER(NO_ASSV) = STACK(STK_PTR);
                    1324.000          /*  STORE CERTAIN VALUES  */
821      1          1325.000          CSTK_PTR = CSTK_PTR + 1;
822      1          1326.000          COMP_STK(CSTK_PTR) = - NO_ASSV;
823      1          1327.000          CSTK_PTR = CSTK_PTR + 1;
824      1          1328.000          COMP_STK(CSTK_PTR) = OP_LNO;
825      1          1329.000          RETURN;
                    1330.000
826      1          1331.000    ROUTINE(47):
                    1332.000          /*  STORE CONSTANT OCCURRING IN RIGHT HAND
                    1333.000              SIDE OF ASSIGNMENT STATEMENT  */
                    1334.000          CSTK_PTR = CSTK_PTR + 1;
827      1          1335.000          IF STACK(STK_PTR)=INT_VAL
828      1          1336.000           THEN DO;
829      1     1    1337.000                 COMP_STK(CSTK_PTR) = IFB_PSN(FXD);
830      1     1    1338.000                 CSTK_PTR = CSTK_PTR + 1;
831      1     1    1339.000                 COMP_STK(CSTK_PTR) = OP_FXD;
832      1     1    1340.000                END;
833      1          1341.000           ELSE
833      1          1342.000           IF STACK(STK_PTR)=RNO_VAL
834      1          1343.000            THEN DO;
835      1     1    1344.000                  COMP_STK(CSTK_PTR) = IFLT_PSN(FLT);
836      1     1    1345.000                  CSTK_PTR = CSTK_PTR + 1;
837      1     1    1346.000                  COMP_STK(CSTK_PTR) = OP_FLT;
838      1     1    1347.000                 END;
839      1          1348.000            ELSE DO;
840      1     1    1349.000                  COMP_STK(CSTK_PTR) = ICH_PSN(STRING);
841      1     1    1350.000                  CSTK_PTR = CSTK_PTR + 1;
842      1     1    1351.000                  COMP_STK(CSTK_PTR) = OP_CH;
843      1     1    1352.000                 END;
```

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STMT LEVEL NEST

844     1       1353.000            RETURN;
                1354.000
845     1       1355.000        ROUTINE(48):
                1356.000            /*  STORE CERTAIN VALUES  */
                1357.000            CSTK_PTR = CSTK_PTR + 1;
846     1       1358.000            COMP_STK(CSTK_PTR) = ID_PSN;
847     1       1359.000            CSTK_PTR = CSTK_PTR + 1;
848     1       1360.000            COMP_STK(CSTK_PTR) = OP_PTR;
849     1       1361.000            RETURN;
                1362.000
850     1       1363.000        ROUTINE(49):
                1364.000            /*  FILL IN ASS_TAB FOR EACH PREFIX(-) AND OPERAND
                1365.000               OCCURRING IN RIGHT HAND SIDE OF
                1366.000               ASSIGNMENT STATEMENT  */
                1367.000            NO_ASSV = NO_ASSV + 1;
851     1       1368.000            ASS_TAB.IOP2(NO_ASSV) = COMP_STK(CSTK_PTR);
852     1       1369.000            ASS_TAB.OP2(NO_ASSV) = COMP_STK(CSTK_PTR-1);
853     1       1370.000            ASS_TAB.OP1(NO_ASSV) = 0;
854     1       1371.000            ASS_TAB.IOP1(NO_ASSV) = OP_NIL;
855     1       1372.000            ASS_TAB.OPER(NO_ASSV) = SUB_VAL;
                1373.000            /*  STORE CERTAIN  VALUES  */
856     1       1374.000            CSTK_PTR = CSTK_PTR - 1;
857     1       1375.000            COMP_STK(CSTK_PTR) = - NO_ASSV;
858     1       1376.000            CSTK_PTR = CSTK_PTR + 1;
859     1       1377.000            COMP_STK(CSTK_PTR) = OP_LNO;
860     1       1378.000            RETURN;
                1379.000
861     1       1380.000        ROUTINE(50):
                1381.000            /*  FILL IN ASS_TAB FOR EACH PAIR OF OPERANDS
                1382.000               OCCURRING IN RIGHT HAND SIDE OF
                1383.000               ASSIGNMENT STATEMENT  */
                1384.000            NO_ASSV = NO_ASSV + 1;
862     1       1385.000            ASS_TAB.IOP2(NO_ASSV) = COMP_STK(CSTK_PTR);
863     1       1386.000            ASS_TAB.OP2(NO_ASSV) = COMP_STK(CSTK_PTR-1);
864     1       1387.000            ASS_TAB.IOP1(NO_ASSV) = COMP_STK(CSTK_PTR-2);
865     1       1388.000            ASS_TAB.OP1(NO_ASSV) = COMP_STK(CSTK_PTR-3);
866     1       1389.000            ASS_TAB.OPER(NO_ASSV) = STACK(STK_PTR);
                1390.000            /*  STORE CERTAIN VALUES  */
867     1       1391.000            CSTK_PTR = CSTK_PTR - 3;
868     1       1392.000            COMP_STK(CSTK_PTR) = - NO_ASSV;
869     1       1393.000            CSTK_PTR = CSTK_PTR + 1;
870     1       1394.000            COMP_STK(CSTK_PTR) = OP_LNO;
871     1       1395.000            RETURN;
                1396.000
872     1       1397.000        ROUTINE(51):
                1398.000            /*  FILL IN KEY TYPE IN ATT_TAB  */
                1399.000            ATT_TAB.KTYPE(NO_ATT) = STACK(STK_PTR)/100;
873     1       1400.000            RETURN;
                1401.000
874     1       1402.000        ROUTINE(56):
                1403.000            /*  IF '+' VALUE ON STACK DELETE IT ELSE
                1404.000               ALTER IT TC NEGATIVE VALUE  */
                1405.000            IF STACK(STK_PTR)=PLUS_VAL
875     1       1406.000             THEN STK_PTR = STK_PTR - 1;
```

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STMT LEVEL NEST

876      1          1407.000              ELSE
876      1          1408.000              IF STACK(STK_PTR)=SUB_VAL
877      1          1409.000               THEN STACK(STK_PTR) = NEG_VAL;
878      1          1410.000              RETURN;
                    1411.000
879      1          1412.000        ROUTINE(57):
                    1413.000              /*  IF NEGATIVE VALUE ON SECOND ELEMENT OF STACK
                    1414.000                  ALTER FXD AND FLT VALUES  */
                    1415.000              IF STACK(STK_PTR-1)=NEG_VAL
880      1          1416.000               THEN DO;
881      1     1    1417.000                     FXD = - FXD;
882      1     1    1418.000                     FLT = - FLT;
883      1     1    1419.000                     STACK(STK_PTR-1) = STACK(STK_PTR);
884      1     1    1420.000                     STK_PTR = STK_PTR - 1;
885      1     1    1421.000                    END;
886      1          1422.000              IF ¬SER_FLG
887      1          1423.000               THEN DO;
888      1     1    1424.000                     IF FPL_PTR=78  THEN GOTO RCUTINE(23);
890      1     1    1425.000                     IF FPL_PTR=213 THEN GOTO ROUTINE(27);
892      1     1    1426.000                    END;
893      1          1427.000              RETURN;
                    1428.000
894      1          1429.000        ROUTINE(58):
                    1430.000              /*  CHECK THAT NO RANGE STATEMENT(S) HAVE BEEN
                    1431.000                  DECLARED  */
                    1432.000              IF ¬RANGE
895      1          1433.000               THEN DO;
                    1434.000                     /*  CLEAR SYMBOL TABLE  */
896      1     1    1435.000                     NO_OTHS = 0;
                    1436.000                     /*  ALTER CERTAIN VALUES  */
897      1     1    1437.000                     FPL_PTR = 214;
898      1     1    1438.000                     STK_PTR = 0;
899      1     1    1439.000                    END;
                    1440.000              /*  CHECK FOR OVEFLOW OF SYMBOL TABLE  */
900      1          1441.000              IF ID_OFLW
901      1          1442.000               THEN DO;
902      1     1    1443.000                     IF RANGE
903      1     1    1444.000                      THEN CALL ERROR('RANGE STATEMENT(S) HAVE '
                    1445.000                                     ||'BEEN DELETED DUE TO '
                    1446.000                                     ||'OVERFLOW OF SYMBOL '
                    1447.000                                     ||'TABLE');
904      1     1    1448.000                     PUT SKIP;
                    1449.000                     /*  CLEAR WHOLE RECORD  */
905      1     1    1450.000                     PTR = ADDR(RECORD);
906      1     1    1451.000                     NULL = 0;
                    1452.000                     /*  ALTER CERTAIN VALUES  */
907      1     1    1453.000                     FPL_PTR = 214;
908      1     1    1454.000                     STK_PTR = 0;
909      1     1    1455.000        ROUTINE(59): /*  CLEAR SYMBOL TABLE  */
                    1456.000                     NO_OTHS = 0;
910      1     1    1457.000                    END;
911      1          1458.000              RETURN;
                    1459.000
912      1          1460.000        ROUTINE(60):
```

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STMT LEVEL NEST

                    1461.000              /*  DECREMENT COUNT OF RANGE STATEMENTS  */
                    1462.000              STK_PTR = 1;
                    1463.000              /*  FILL IN RANGE VALUE IN ST_TAB  */
913      1          1464.000              ST_TAB = STACK(STK_PTR);
914      1          1465.000              RETURN;
                    1466.000
915      1          1467.000         ROUTINE(61):
                    1468.000              IF SER_FLG
916      1          1469.000               THEN FPL_PTR = -4;
917      1          1470.000               ELSE
917      1          1471.000               IF ST_TAB=READ_VAL
918      1          1472.000                THEN GOTO ROUTINE(45);
919      1          1473.000              RETURN;
                    1474.000
920      1          1475.000         ROUTINE(62):
                    1476.000              IF SER_FLG
921      1          1477.000               THEN FPL_PTR = -3;
922      1          1478.000              RETURN;
                    1479.000
923      1          1480.000         ROUTINE(63):
                    1481.000              /*  BEGINNING OF SESSION  */
                    1482.000              IF FIRST
924      1          1483.000               THEN DO;
                    1484.000                     /*  CLEAR WHOLE RECORD  */
925      1     1    1485.000                     PTR = ADDR(RECORD);
926      1     1    1486.000                     NULL = 0;
                    1487.000                     /*  CLEAR SYMBOL TABLE  */
927      1     1    1488.000                     NO_OTHS = 0;
                    1489.000                     /*  SET CERTAIN VALUES  */
928      1     1    1490.000                     BUF_PTR = 120;
929      1     1    1491.000                     BUF_LEN = 118;
930      1     1    1492.000                     ID_PSN = 0;
931      1     1    1493.000                     WS_BEG = 21;
932      1     1    1494.000                     NO_WS = 20;
933      1     1    1495.000                     VAR_BEG = 31;
934      1     1    1496.000                     NO_VARS = 30;
935      1     1    1497.000                     SER_FLG = '0'B;
936      1     1    1498.000                     NO_ERRS = 0;
937      1     1    1499.000                     RANGE = '0'B;
938      1     1    1500.000                     ID_OFLW = '0'B;
939      1     1    1501.000                     HOLD_WS = '0'B;
940      1     1    1502.000                     AL_PTR = 0;
                    1503.000                     /*  RESET FIRST BIT  */
941      1     1    1504.000                     FIRST = '0'B;
942      1     1    1505.000                    END;
943      1          1506.000              ELSE DO;
944      1     1    1507.000                     IF SER_FLG
945      1     1    1508.000                      THEN DO;
946      1     2    1509.000                           IF NO_ERRS¬=0
947      1     2    1510.000                            THEN DO;
948      1     3    1511.000                                 CALL DEL_ST;
949      1     3    1512.000                                 PUT SKIP;
950      1     3    1513.000                                END;
951      1     2    1514.000                           IF ST_TAB=GET_VAL | ST_TAB=HOLD_VAL |
```

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STMT LEVEL NEST

                                      ST_TAB=CEL_VAL
 952    1    2             THEN DO;
 953    1    3                  AL_PTR = 0;
                                /*  CLEAR WHCLE RECCRD EXCEPT
                                    RA_TAB  */
 954    1    3                  PTR1 = ADDR(RECORD);
 955    1    3                  DUMPTR1 = DUMPTR1 + 82;
 956    1    3                  NULL1 = 0;
                                /*  CLEAR WORK CCMPCNENT COLUMN
                                    IN RA_TAB  */
 957    1    3                  DO I=1 TO NO_RV;
 958    1    4                   RA_TAB.WCOMP(I) = 0;
 959    1    4                  END;
 960    1    3                  NO_RV = NO_TRV;
 961    1    3                 END;
 962    1    2             ELSE
 962    1    2             IF ST_TAB=NEW_VAL | ST_TAB=DROP_VAL |
                              ST_TAB=PUT_VAL | ST_TAB=READ_VAL |
                              ST_TAB=WS_VAL  | ST_TAB=LIST_VAL
 963    1    2              THEN DO;
                                 /*  CLEAR WHOLE RECORD  */
 964    1    3                   PTR = ADDR(RECORD);
 965    1    3                   NULL = 0;
                                 /*  CLEAR SYMBOL TABLE  */
 966    1    3                   NO_OTHS = 0;
 967    1    3                  END;
 968    1    2           END;
 969    1    1       PUT SKIP LIST('END OF STATEMENT');
 970    1    1       PUT SKIP;
 971    1    1      END;

 972    1       SER_FLG = '0'B;
 973    1       NO_ERRS = 0;
 974    1       ID_OFLW = '0'B;
 975    1       CALL LEX_ANL;

 976    1      END;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
	ADDR	GENERIC,BUILT-IN FUNCTION 164,905,925,954,964
7	********* AL_PTR	STATIC,ALIGNED,BINARY,FIXED(15,0) 336,336,337,344,366,376,544,554,604,604,605,605,612,612,940,953
3	********* AL_TAB	(10)IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 702,705
3	********* ALEN	IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 759
3	********* ALIST	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 628
3	********* ALIST	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 360
3	********* ALISTPTR	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 553,629
3	********* ALISTPTR	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 361,375
3	********* ANAME	IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 734
3	********* ANAME	IN OR_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 679,723
3	********* ANAME	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 482,557,650
3	********* ANAME	IN HT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 605,689
3	********* ANAME	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 317,337,379,605
3	********* ANAME1	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		532
3	********* ANAME1	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 514
3	********* ANAME2	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 533
3	********* ANAME2	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 516
3	********* APOSN	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
3	********* APOSN1	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
3	********* APOSN2	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
3	ASS_TAB	(30)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
3	ATT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
3	********* ATYPE	IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 743,745
3	********* ATYPE	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
7	********* BUF_LEN	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 929
7	********* BUF_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 14,928
2	BUFFER	STATIC,EXTERNAL,UNALIGNED,STRING(121),CHARACTER,VARYING 13
7	********* C_TCOMP	STATIC,ALIGNED,BINARY,FIXED(15,0) 261,485,519,536,579,579,582
7	********* C_WCOMP	STATIC,ALIGNED,BINARY,FIXED(15,0) 93,95,106,260,262,484,518,535,581,581,584
9	********* CBR_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 736
2	CDOUT	FILE,EXTERNAL,OUTPUT 110,111,114,115,116,117,118,122,123,124,125,126,130,131,132,133,134

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		138,139,140,143,144,145,146,150,151,152,153,157,158,159,160
9	********* CH_TYPE	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 498,736,745
3	CHARS	(10)IN RECORD,STATIC,EXTERNAL,UNALIGNED,STRING(20),CHARACTER 69,82,159
7	********* COMP_STK	(20)STATIC,ALIGNED,BINARY,FIXED(15,0) 822,824,829,831,835,837,840,842,846,848,851,852,857,859,862,863,864 865,868,870
67	********* CCN_PTR	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 68,69,78,81,84
47	********* CCN_PTR	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 48,49,58,61,64
27	********* CON_PTR	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 28,29,38,41,44
3	********* CONLEN	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 499
3	********* CONPTR	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 488,493,497,570,574,651
3	********* CONTYPE	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 489,494,498,571,575,652
7	********* CSTK_PTR	STATIC,ALIGNED,BINARY,FIXED(15,0) 225,821,821,822,823,823,824,826,826,829,830,830,831,835,836,836,837 840,841,841,842,845,845,846,847,847,848,851,852,856,856,857,858,858 859,862,863,864,865,867,867,868,869,869,870
9	********* DBRN_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 172
18	DEL_ST	ENTRY,DECIMAL,FLOAT(SINGLE) 948
9	********* DEL_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 237,951
6	DISCARD_BY	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(2),BIT
9	********* DROP_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 962
3	DT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
3		DTOV_TAB	(5)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
4		DUMPTR1	AUTOMATIC,DEFINED,ALIGNED,BINARY,FIXED(31,0) 955,955
9	*********	END_VARS	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 782
9	*********	END_WS	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 249
9	*********	EQ_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 761
11		ERROR	ENTRY,DECIMAL,FLOAT(SINGLE) 36,56,76,185,199,213,230,243,253,270,279,290,300,311,326,341,348,356 370,386,413,420,432,439,457,472,509,527,548,563,591,609,616,624,638 665,673,699,710,718,731,740,749,756,765,775,786,797,903
3		FB31	(10)IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(31,0) 29,42,145
7		FIRST	STATIC,EXTERNAL,UNALIGNED,STRING(1),BIT 923,941
47		FLT	PARAMETER,ALIGNED,DECIMAL,FLOAT(DOUBLE) 46,49,62
2		FLT	STATIC,EXTERNAL,ALIGNED,DECIMAL,FLOAT(DOUBLE) 493,574,835,882,882
3		FLT16	(10)IN RECORD,STATIC,EXTERNAL,ALIGNED,DECIMAL,FLOAT(DOUBLE) 49,62,152
3		FN_MT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
44		FOUND	STATEMENT LABEL CONSTANT 30
64		FOUND	STATEMENT LABEL CONSTANT 50
84		FOUND	STATEMENT LABEL CONSTANT 70
6		FPL	(-4:220)STATIC,EXTERNAL,STRUCTURE,STRUCTURE
7	*********	FPL_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 109,460,460,888,890,897,907,916,921
3	*********	FUNCT	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 425,643

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
3 *********	FUNCT	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 334
7	FUNCT	STATIC,UNALIGNED,STRING(1),BIT 258,332,409,428
7 *********	FUNCT_PSN	STATIC,ALIGNED,BINARY,FIXED(15,0) 333,334,344,366,379
27	FXD	PARAMETER,ALIGNED,BINARY,FIXED(31,0) 26,29,42
2	FXD	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(31,0) 264,488,570,651,759,829,881,881
9 *********	GET_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 605,612,951
3	GT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
9 *********	HOLD_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 283,402,605,612,951
7	HOLD_WS	STATIC,UNALIGNED,STRING(1),BIT 226,233,404,939
3	HT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
*********	I	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 89,90,92,93,93,95,117,117,117,125,125,125,133,133,133,145,145,145 152,152,152,159,159,159,180,181,181,285,286,381,382,443,444,447,448 477,478,479,479,481,537,538,539,539,541,645,646,647,647,649,655,656 659,660,683,684,685,685,687,704,705,802,803,806,807,807,811,957,958
66 *********	ICH_PSN	ENTRY,BINARY,FIXED(15,0) 497,840
9 *********	ICNT_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 559
7	ID_OFLW	STATIC,EXTERNAL,UNALIGNED,STRING(1),BIT 900,938,974
87 *********	ID_PSN	PARAMETER,ALIGNED,BINARY,FIXED(15,0) 86,90
7 *********	ID_PSN	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 174,226,239,247,249,257,273,275,286,303,314,317,337,360,379,382,392 444,448,451,453,462,465,516,533,557,602,605,605,628,650,679,682,684 689,692,702,705,723,734,779,800,818,846,930
3 *********	ID_TAB	(10)IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 800,803,806,807,807,811

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
5		IDENT_NAME	IN IDENTS(0:40),STATIC,EXTERNAL,UNALIGNED,INITIAL,STRING(20), CHARACTER 125,133,397,397,806,806,807,807
5	*********	IDENT_VAL	IN IDENTS(0:40),STATIC,EXTERNAL,ALIGNED,INITIAL,BINARY,FIXED (15,0) 169,192,193,249,394,398,779,803,808,809
5		IDENTS	(0:40)STATIC,EXTERNAL,STRUCTURE,STRUCTURE 117
26	*********	IFB_PSN	ENTRY,BINARY,FIXED(15,0) 488,570,651,829
46	*********	IFLT_PSN	ENTRY,BINARY,FIXED(15,0) 493,574,835
9	*********	IFN_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 319
5		INF_FLD	IN IDENTS(0:40),STATIC,EXTERNAL,ALIGNED,INITIAL,DECIMAL, FLOAT(DOUBLE) 207,239,273,275,399,453,810
6		INPUT_SYM	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT
9	*********	INT_TYPE	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 489,571,652
8	*********	INT_VAL	STATIC,EXTERNAL,ALIGNED,INITIAL,BINARY,FIXED(15,0) 486,559,568,634,752,827
9	*********	INT_VAR	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 266,808
	*********	INTERPR	EXTERNAL,ENTRY,BINARY,FIXED(15,0) 163
3	*********	IOP1	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 817,854,864
3	*********	IOP2	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 819,851,862
	*********	K	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 321,322
3	*********	KTYPE	IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 872

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
335	L1	STATEMENT LABEL CONSTANT 328
713	L10	STATEMENT LABEL CONSTANT 706
725	L11	STATEMENT LABEL CONSTANT 712
460	L12	STATEMENT LABEL CONSTANT 445,449,452
463	L13	STATEMENT LABEL CONSTANT 458,461
393	L2	STATEMENT LABEL CONSTANT 388
263	L3	STATEMENT LABEL CONSTANT 245,255
543	L4	STATEMENT LABEL CONSTANT 511,529
668	L5	STATEMENT LABEL CONSTANT 657,661
501	L6	STATEMENT LABEL CONSTANT 474
316	L7	STATEMENT LABEL CONSTANT 281,292
681	L8	STATEMENT LABEL CONSTANT 667
801	L9	STATEMENT LABEL CONSTANT 777,788
	LENGTH	GENERIC,BUILT-IN FUNCTION 499
*********	LEX_ANL	EXTERNAL,ENTRY,BINARY,FIXED(15,0) 975
7 *********	LEX_VAL	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 178,266,736,761
9 *********	LIST_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 962
3 *********	LRN_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 247,451

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
9	********* LRN_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 175
3	********* LRNAME	IN VAR_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
3	********* LRNAME	IN OR_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 678
3	********* LRNAME	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 476,644,682
3	********* LRNAME	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 531
3	********* LRNAME	IN HT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 286,303,448,660
3	********* LRNAME	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 314,382,392,444,656
3	********* LRNAME	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 90,104,104,204,478,538,646,684
3	********* LRNAME1	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 513
3	********* LRNAME2	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 515
10	********* MAX_ALV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 695
10	********* MAX_ATT	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 727
10	********* MAX_CHAR	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 72
10	********* MAX_DT	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 505
10	********* MAX_DTOV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 523
10	********* MAX_FB31	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		32
10	********* MAX_FLT16	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 52
10	********* MAX_GTV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 307,352
10	********* MAX_HTV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 296
10	********* MAX_IDV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 793
10	********* MAX_MT	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 468,620
10	********* MAX_OV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 669,714
10	********* MAX_RV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 195
10	********* MAX_WPV	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 587
12	MESSAGE	PARAMETER,UNALIGNED,STRING(120),CHARACTER 11,15
	MOD	GENERIC,BUILT-IN FUNCTION 319,779,803
9	********* NEG_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 559,877,879
9	********* NEW_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 962
3	********* NO_ALV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 694,694,695,702,704
3	********* NO_ASSV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 815,815,816,817,818,819,820,822,850,850,851,852,853,854,855,857,861 861,862,863,864,865,866,868
3	********* NO_ATT	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 726,726,727,734,743,745,759,872
3	********* NO_CHAR	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 68,72,81,82,136,155,159
3	********* NO_DT	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 504,504,505,513,514,515,516,517,518,519

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
3	********* NO_DTOV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 522,522,523,531,532,533,534,535,536,541
7	********* NO_ERRS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 20,22,35,35,55,55,75,75,184,184,198,198,212,212,229,229,242,242,252 252,269,269,278,278,289,289,299,299,310,310,325,325,340,340,347,347 355,355,369,369,385,385,412,412,419,419,431,431,438,438,456,456,471 471,508,508,526,526,547,547,562,562,590,590,608,608,615,615,623,623 637,637,664,664,672,672,698,698,709,709,717,717,730,730,739,739,748 748,755,755,764,764,774,774,785,785,796,796,936,946,973
3	********* NO_F831	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 28,32,41,42,136,141,145
3	********* NO_FLT16	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 48,52,61,62,136,148,152
3	********* NO_GTV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 306,306,307,314,317,333,352,360,361,361,362,362,374,374,375,381,391 391,392,443,544,612,655
3	********* NO_HTV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 285,295,295,296,303,447,612,659,689
3	********* NO_IDV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 792,792,793,800,802
3	********* NO_MT	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 424,424,425,467,467,468,476,481,482,483,484,485,488,489,493,494,497 498,499,552,552,553,620,628,629,629,630,630,642,642,643,644,649,650 651,652,682,687
7	********* NO_NIDV	STATIC,ALIGNED,BINARY,FIXED(15,0) 222,781,781,782
7	********* NO_OTHS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 112,117,166,896,909,927,966
3	********* NO_OV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 668,668,669,677,678,679,713,713,714,722,723
3	********* NO_RV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 89,102,102,103,104,105,106,180,194,194,195,203,204,205,206,321,416 435,957,960
7	********* NO_TRV	STATIC,ALIGNED,BINARY,FIXED(15,0) 206,960
3	********* NO_VAR	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
7	********* NO_VARS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 128,133,782,805,805,806,808,809,810,811,934
3	********* NO_WPV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		586,586,587,595,596,597,599
7	********* NO_WS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 120,125,249,396,396,397,398,399,400,932
4	********* NULL	(826)BASED(PTR),ALIGNED,BINARY,FIXED(15,0) 165,906,926,965
4	********* NULL1	(785)BASED(PTR1),ALIGNED,BINARY,FIXED(15,0) 956
7	********* OID_PSN	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 168,169,171,464,502,515,644,646,656,660,678,691,816
3	********* OP1	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 816,853,865
3	********* OP2	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 818,852,863
9	********* OP_CH	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 842
9	********* OP_FLT	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 837
9	********* OP_FXD	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 831
9	********* OP_LNO	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 824,859,870
9	********* OP_NIL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 854
9	********* OP_PTR	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 817,819,848
3	********* OPER	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 820,855,866
3	********* OPER	IN WP_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 597
3	OR_TAB	(5)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
3	********* ORDER	IN OR_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 677,722

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
108		OUT	STATEMENT LABEL CONSTANT 96
9	*********	PLUS_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 874
		PTR	AUTOMATIC,ALIGNED,POINTER 164,165,905,906,925,926,964,965
		PTR1	AUTOMATIC,ALIGNED,POINTER 954,956
9	*********	PUT_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 962
3	*********	Q_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 264,273
3	*********	QUANT	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 105,105,181,205
3		RA_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
7		RANGE	STATIC,UNALIGNED,STRING(1),BIT 208,220,894,902,937
9	*********	READ_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 221,769,917,962
3		RECORD	STATIC,EXTERNAL,STRUCTURE,STRUCTURE 164,905,925,954,964
6		REDUCED_BY	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(3),BIT
3	*********	RELOP	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 483,567
3	*********	RELOP	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 534
3	*********	RELOP	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 517
9	*********	RGE_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 219
3	*********	RN_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 602,692
3	*********	RNAME	IN VAR_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		(15,0)
3	********* RNAME	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 481,649,687
3	********* RNAME	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 541
3	********* RNAME	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 103,103,181,203,322,322,481,541,649,687
9	********* RNO_TYPE	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 494,575
8	********* RNO_VAL	STATIC,EXTERNAL,ALIGNED,INITIAL,BINARY,FIXED(15,0) 491,833
9	********* RNO_VAR	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 809
2	RCUTINE	(63)AUTOMATIC,INITIAL,LABEL 110,168,171,174,178,180,218,236,264,266,275,317,319,336,366,379,381 394,409,428,443,464,467,502,544,557,559,579,581,586,602,604,634,655 682,689,691,694,704,726,736,745,761,769,802,815,826,845,850,861,872 874,879,894,909,912,915,920,923,109,187,201,215,407,889,891,918
87	********* RPOSN	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 88,92,100,103,104,105
86	SC_RATAB	ENTRY,DECIMAL,FLOAT(SINGLE) 462
6	SCAN	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(2),BIT
7	********* SEM1	STATIC,ALIGNED,BINARY,FIXED(15,0) 168,171,181,190,192,203,464,476,478,502,513,531,538
7	********* SEM2	STATIC,ALIGNED,BINARY,FIXED(15,0) 169,172,192,465,482,514,532
7	********* SEM3	STATIC,ALIGNED,BINARY,FIXED(15,0) 174,190,193,204,207
7	********* SEM4	STATIC,ALIGNED,BINARY,FIXED(15,0) 175,193
7	********* SEM5	STATIC,ALIGNED,BINARY,FIXED(15,0) 176,178,181,205,207
1	SEM_ROU	ENTRY,DECIMAL,FLOAT(SINGLE)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
6	SEM_ROUT	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT 109
7	SER_FLG	STATIC,EXTERNAL,UNALIGNED,STRING(1),BIT 34,54,74,183,197,211,228,241,251,268,277,288,298,309,324,339,346,354 368,384,411,418,430,437,455,470,507,525,546,561,589,607,614,622,636 663,671,697,708,716,729,738,747,754,763,773,784,795,886,915,920,935 944,972
	SPRINT	FILE,EXTERNAL 13,14,15,16,19,21,22,23,24,37,57,77,186,200,214,231,244,254,271,280 291,301,312,327,342,349,357,371,387,414,421,433,440,473,510,528,549 564,592,610,617,625,639,666,674,700,711,719,732,741,750,757,766,776 787,798,904,949,969,970
3 *********	ST_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 218,219,221,223,236,237,283,402,605,605,612,612,769,913,917,951,951 951,962,962,962,962,962,962
2 *********	STACK	(0:25)STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 218,236,319,334,425,483,486,491,517,534,559,559,559,567,568,597,634 643,677,722,736,743,752,771,820,827,833,866,872,874,876,877,879,883 883,913
7 *********	STK_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 218,236,319,334,425,483,486,491,517,534,559,559,559,567,568,597,634 643,677,722,736,743,752,771,820,827,833,866,872,874,875,875,876,877 879,883,883,884,884,898,908,912,913
67	STRING	PARAMETER,UNALIGNED,STRING(20),CHARACTER,VARYING 66,69,82
7	STRING	STATIC,EXTERNAL,UNALIGNED,STRING(20),CHARACTER,VARYING 497,499,840
9 *********	SUB_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 855,876
	SUBSTR	GENERIC,BUILT-IN FUNCTION 807,807
6	SYM_ON_STK	IN FPL(-4:220),STATIC,EXTERNAL,UNALIGNED,STRING(6),BIT
3 *********	TCOMP	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 485
3 *********	TCOMP	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 536
3 *********	TCOMP	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 519

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
7	********* UDWS_PSN	STATIC,ALIGNED,BINARY,FIXED(15,0) 226,405
7	********* VAR_BEG	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 133,933
3	VAR_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
9	********* VAR_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 779,803
3	********* V#	IN VAR_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
3	********* V#	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
3	********* V#	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
3	********* WCOMP	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 484
3	********* WCOMP	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 535
3	********* WCOMP	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 518
3	********* WCOMP	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 93,93,95,106,958
3	********* WCOMP1	IN WP_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 595
3	********* WCOMP2	IN WP_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 596
3	********* WN_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 257,394,394,397,400,405,691
7	********* WP_STK	(5)STATIC,ALIGNED,BINARY,FIXED(15,0) 262,584,595,596,599
3	WP_TAB	(5)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
7	********* WPSTK_PTR	STATIC,ALIGNED,BINARY,FIXED(15,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		259,262,583,583,584,595,596,598,598,599
7	********* WS_BEG	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 125,931
8	********* WS_VAL	STATIC,EXTERNAL,ALIGNED,INITIAL,BINARY,FIXED(15,0) 223,249,394,398,771,962

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
7	CCMP_STK	40
6	FPL	704
5	IDENTS	1310
4	NULL	1652
4	NULL1	1570
3	RECORD	1652
2	ROUTINE	504
2	STACK	52
7	WP_STK	10

STORAGE REQUIREMENTS.

THE STORAGE AREA FCR THE PROCEDURE LABELLED SEM_ROU IS 1532 BYTES LONG.

THE STORAGE AREA (IN STATIC) FCR THE PRCCEDURE LABELLED ERROR IS 196 BYTES LONG.

THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED DEL_ST IS 188 BYTES LCNG.

THE STORAGE AREA (IN STATIC) FCR THE PRCCEDURE LABELLEC IFB_PSN IS 280 BYTES LONG.

THE STORAGE AREA (IN STATIC) FCR THE PROCEDURE LABELLED IFLT_PSN IS 280 BYTES LONG.

THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED ICH_PSN IS 292 BYTES LCNG.

THE STORAGE AREA (IN STATIC) FCR THE PROCEDURE LABELLEC SC_RATAB IS 224 BYTES LONG.

THE PROGRAM CSECT IS NAMED SEM_ROU AND IS 28170 BYTES LCNG.

THE STATIC CSECT IS NAMED SEM_ROUA ANC IS 7808 BYTES LONG.

STATISTICS SOURCE RECORDS = 1551,PROG TEXT STMNTS = 976,CBJECT BYTES = 28170

COMPILER DIAGNOSTICS.

ERRORS.

IEM1105I 4 THE DATA CHARACTERISTICS OF DUMPTR1 DECLARED IN STATEMENT NUMBER 4 DO NOT MATCH THOSE OF THE DEFINING BASE.

WARNINGS.

IEM2899I INITIALIZATION SPECIFIED FOR TOO FEW ELEMENTS IN STATIC ARRAY IDENT_NAME

IEM2899I INITIALIZATION SPECIFIED FOR TOO FEW ELEMENTS IN STATIC ARRAY IDENT_VAL

IEM2899I INITIALIZATION SPECIFIED FOR TOO FEW ELEMENTS IN STATIC ARRAY INF_FLD

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS. SCARDS/SPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM0526I 1 OPTION MAIN HAS NOT BEEN SPECIFIED FOR THE EXTERNAL PROCEDURE, STATEMENT NUMBER 1

IEM0764I ONE OR MORE FIXED BINARY ITEMS OF PRECISION 15 OR LESS HAVE BEEN GIVEN HALFWORD STORAGE. THEY ARE FLAGGED '*********' IN THE XREF/ATR LIST.

IEM1790I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS 109.

END OF DIAGNOSTICS.

COMPILE TIME 57.38 SECS

ELAPSED TIME 22.79 MINS

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 SSSSSSSS     EEEEEEEEEE   MMM       MMM
SSSS   SSS    EEEEEEEEEE   MMMM     MMMM
SSS          EEE          MMMMM   MMMMM
 SSSSSSSS    EEEEEE       MMM MMM MMM
       SSS   EEE          MMM  M  MMM
SSS    SSSS  EEEEEEEEEE   MMM     MMM
 SSSSSSSS    EEEEEEEEEE   MMM     MMM
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RRRRRRRR       OOOOOOOO    UUU      UUU
RRRRRRRRR    OOO    OOO   UUU      UUU
RRR   RRR    OOO    OOO   UUU      UUU
RRRRRRRRR    OOO    OOO   UUU      UUU
RRRRRRRR     OOO    OOO   UUUU    UUUU
RRR RRR      OOO    OOO   UUUUUUUUUU
RRR  RRR      OOOOOOOO      UUUUU
```

VERSION 5.2C MTS PL/I COMPILER (F) TIME 05:36.35 DATE 02-11-75

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

DIAG

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
  EBCDIC
  CHAR60
NOMACRO
  SOURCE2
NOMACDCK
  COMP
  SOURCE
  ATR
  XREF
NOEXTREF
NOLIST
NOLOAD
  DECK
  FLAGW
  STMT
  SIZE=01P
  LINECNT=060
  OPT=01
  SORMGIN=(001,072)
NOEXTDIC
  NEST
  OPLIST
  SYNCHKS
  DIAG
```

```
*OPTIONS IN EFFECT*   EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,NOLOAD,
*OPTIONS IN EFFECT*   DECK,FLAGW,STMT,SIZE=01P,LINECNT=060,OPT=01,SORMGIN=(001,072),NOEXTDIC,
*OPTIONS IN EFFECT*   NEST,OPLIST,SYNCHKS,DIAG
```

```
STMT LEVEL NEST
  1                1.000  LEX_ANL : PROCEDURE;
                    2.000
                    3.000       /* ****************************************************************
                    4.000          ****************************************************************
                    5.000          *                      LEXICAL  ANALYZER                       *
                    6.000          *                                                              *
                    7.000          *                           FCR                                *
                    8.000          *                                                              *
                    9.000          *                   DATA  SUBLANGUAGE  ALPHA                   *
                   10.000          ****************************************************************
                   11.000          ****************************************************************
                   12.000       */
  2      1         13.000            DCL SOURCE FILE RECORD INPUT ENV(U(120)),
                   14.000                ENDSTR ENTRY(CHAR(1)) RETURNS(BIT(1)),
                   15.000                BUFFER CHAR(121) VAR EXTERNAL,
                   16.000                STRING CHAR(20) VAR EXTERNAL,
                   17.000                FXD FIXED BIN(31) EXTERNAL,
                   18.000                FLT FLOAT(16) EXTERNAL,
                   19.000                (SER_FLG,ID_OFLW) BIT(1) EXTERNAL,
                   20.000                (CLOCK,DAY) CHAR(8) EXTERNAL,
                   21.000                (BUF_PTR,BUF_LEN,NO_ERRS) FIXED BIN EXTERNAL,
                   22.000                (WS_BEG,NO_WS,VAR_BEG,NO_VARS) FIXED BIN EXTERNAL,
                   23.000                (ID_PSN,OID_PSN,NO_OTHS) FIXED BIN EXTERNAL,
                   24.000                (LEX_VAL,EOS_VAL,INT_VAL,RNO_VAL) FIXED BIN EXTERNAL;
                   25.000
  3      1         26.000            DCL 1 IDENTS(0:40) EXTERNAL,
                   27.000                 2 IDENT_NAME CHAR(20),
                   28.000                 2 IDENT_VAL FIXED BIN,
                   29.000                 2 INF_FLD FLOAT(16);
                   30.000
  4      1         31.000            DCL 1 BASIC_SYM(41) STATIC,
                   32.000                 2 KEYWORD CHAR(20) VAR
                   33.000                           INITIAL ('COUNT',
                   34.000                                    'DELETE',
                   35.000                                    'DROP',
                   36.000                                    'READ',
                   37.000                                    'FIXED31',
                   38.000                                    'RANGE',
                   39.000                                    'DEFINE',
                   40.000                                    'ALL',
                   41.000                                    'NEW',
                   42.000                                    'KEY',
                   43.000                                    'GET',
                   44.000                                    'PUT',
                   45.000                                    'STOP',
                   46.000                                    'ICOUNT',
                   47.000                                    'RELEASE',
                   48.000                                    'DESTROY',
                   49.000                                    'HOLD',
                   50.000                                    'AND',
                   51.000                                    'MAX',
                   52.000                                    'UPDATE',
                   53.000                                    'END',
                   54.000                                    'MIN',
                   55.000                                    'TOP',
                   56.000                                    'IAVERAGE',
```

```
STMT LEVEL NEST
                                     'UP',
                                     'IMIN',
                                     'FLOAT',
                                     'CHAR',
                                     'CHARVAR',
                                     'DCWN',
                                     'IMAX',
                                     'AVERAGE',
                                     'BCTTOM',
                                     'SOME',
                                     'OR',
                                     'ITOTAL',
                                     'TOTAL',
                                     'FIXED',
                                     'FLCAT16',
                                     'LIST',
                                     'EXECUTE'),
                         2 KEYWORD_VAL FIXED BIN
                                  INITIAL (0217,
                                       0002,
                                       0003,
                                       0009,
                                       0130,
                                       0116,
                                       0012,
                                       0110,
                                       0008,
                                       0144,
                                       0001,
                                       0007,
                                       0011,
                                       0218,
                                       0005,
                                       0015,
                                       0004,
                                       0119,
                                       0317,
                                       0105,
                                       0013,
                                       0417,
                                       0121,
                                       0118,
                                       0206,
                                       0418,
                                       0430,
                                       0530,
                                       0630,
                                       0106,
                                       0318,
                                       0117,
                                       0221,
                                       0210,
                                       0120,
                                       0518,
```

```
STMT LEVEL NEST

                    111.000                                  0517,
                    112.000                                  0230,
                    113.000                                  0330,
                    114.000                                  0109,
                    115.000                                  0014);
                    116.000
  5      1          117.000      DCL POINTER(0:22) FIXED BIN STATIC
                    118.000                        INITIAL (1,
                    119.000                                 2,
                    120.000                                 3,
                    121.000                                 4,
                    122.000                                 5,
                    123.000                                 6,
                    124.000                                 8,
                    125.000                                 11,
                    126.000                                 12,
                    127.000                                 15,
                    128.000                                 16,
                    129.000                                 17,
                    130.000                                 19,
                    131.000                                 22,
                    132.000                                 25,
                    133.000                                 27,
                    134.000                                 30,
                    135.000                                 32,
                    136.000                                 34,
                    137.000                                 37,
                    138.000                                 39,
                    139.000                                 40,
                    140.000                                 42);
                    141.000
  6      1          142.000      DCL OP_S_B(21) FIXED BIN STATIC
                    143.000                     INITIAL (0124,
                    144.000                              0224,
                    145.000                              0624,
                    146.000                              0133,
                    147.000                              0135,
                    148.000                              0129,
                    149.000                              0000,
                    150.000                              0222,
                    151.000                              0123,
                    152.000                              0223,
                    153.000                              0125,
                    154.000                              0126,
                    155.000                              0127,
                    156.000                              0128,
                    157.000                              0122,
                    158.000                              0324,
                    159.000                              0131,
                    160.000                              0132,
                    161.000                              0424,
                    162.000                              0524,
                    163.000                              0134);
                    164.000
```

```
STMT LEVEL NEST
  7     1          165.000          DCL IDENT_LEX_VAL  FIXED BIN STATIC INITIAL(37),
                   166.000              MAX_CTH_IDENTS FIXED BIN STATIC INITIAL(20);
                   167.000
  8     1          168.000          DCL 1 FALSE,
                   169.000               2 NIL FIXED BIN(31),
                   170.000               2 SYMBOL CHAR(20) VAR;
                   171.000
  9     1          172.000          DCL (HASH_VAL,LEN_OF_SYM) FIXED BIN,
                   173.000              (TEMP,CH)  CHAR(1),
                   174.000              (SWITCH1,SWITCH2) BIT(1),
                   175.000              LAB(0:8) LABEL,
                   176.000              LEV(0:4) LABEL;
                   177.000
                   178.000
                   179.000      /* ***************************************************************
                   180.000         *  ROUTINE  'LEX_ANL'  RETURNS THE  NEXT  LEXEME  VALUE IN    *
                   181.000         *  'LEX_VAL'                                                  *
                   182.000         ***************************************************************
                   183.000      */
                   184.000
                   185.000
 10     1          186.000  R_CHAR : PROCEDURE(CH);
 11     2          187.000           DCL CH CHAR(1);
                   188.000
                   189.000      /* ***************************************************************
                   190.000         *  PROCEDURE  'R_CHAR' RETURNS  THE NEXT  CHARACTER IN  'CH'  *
                   191.000         ***************************************************************
                   192.000      */
 12     2          193.000           IF BUF_PTR>=BUF_LEN
 13     2          194.000            THEN DO;
 14     2    1     195.000                 IF (BUF_PTR=BUF_LEN & SUBSTR(BUFFER,BUF_LEN,1)='-') |
                   196.000                                       BUF_PTR=BUF_LEN+2
 15     2    1     197.000                  THEN DO;
 16     2    2     198.000              L1:       READ FILE(SOURCE) INTO (BUFFER);
 17     2    2     199.000                        BUF_LEN = LENGTH(BUFFER);
 18     2    2     200.000                        PUT FILE(CDOUT) SKIP EDIT(BUFFER)(X(3),A);
 19     2    2     201.000                        PUT FILE(CDOUT) SKIP;
 20     2    2     202.000                        IF SUBSTR(BUFFER,1,1)='-' & BUF_LEN=1
 21     2    2     203.000                         THEN GOTO L1;
 22     2    2     204.000                        SUBSTR(BUFFER,BUF_LEN+1,1) = '?';
 23     2    2     205.000                        BUF_PTR = 1;
 24     2    2     206.000                       END;
 25     2    1     207.000                 END;
 26     2          208.000                 CH = SUBSTR(BUFFER,BUF_PTR,1);
 27     2          209.000                 BUF_PTR =  BUF_PTR + 1;
 28     2          210.000  END;
                   211.000
                   212.000
 29     1          213.000  NUMBER : PROCEDURE;
 30     2          214.000           DCL (DEC_VAL,NO_DECS) FLOAT(16);
                   215.000
                   216.000      /* ***************************************************************
                   217.000         *  PROCEDURE  'NUMBER' ASSIGNS LEXEME VALUES TO NUMBERS  *
                   218.000         ***************************************************************
```

```
STMT LEVEL NEST
                          219.000        */
 31     2                 220.000             FXD = 0;
 32     2                 221.000             DO WHILE(CH>='A');
 33     2    1            222.000              IF CH>'Z'
 34     2    1            223.000               THEN FXD = FXD*10 + CH;
 35     2    1            224.000               ELSE DO;
 36     2    2            225.000                     SER_FLG = '1'B;
 37     2    2            226.000                     NO_ERRS = NO_ERRS + 1;
 38     2    2            227.000                     CALL ERROR('ALPHABETIC CHARACTER IN NUMERICAL '
                          228.000                                ||'CONSTANT IGNORED');
 39     2    2            229.000                     PUT SKIP;
 40     2    2            230.000                    END;
 41     2    1            231.000              CALL R_CHAR(CH);
 42     2    1            232.000             END;
 43     2                 233.000             IF CH¬='.'
 44     2                 234.000              THEN LEX_VAL = INT_VAL;
 45     2                 235.000              ELSE DO;
 46     2    1            236.000                     CALL R_CHAR(CH);
 47     2    1            237.000                     DEC_VAL = 0;
 48     2    1            238.000                     NO_DECS = 1;
 49     2    1            239.000                     DO WHILE(CH>='A');
 50     2    2            240.000                      IF CH>'Z'
 51     2    2            241.000                       THEN DO;
 52     2    3            242.000                              DEC_VAL = DEC_VAL*10 + CH;
 53     2    3            243.000                              NO_DECS = NO_DECS*10;
 54     2    3            244.000                             END;
 55     2    2            245.000                       ELSE DO;
 56     2    3            246.000                              SER_FLG = '1'B;
 57     2    3            247.000                              NO_ERRS = NO_ERRS + 1;
 58     2    3            248.000                              CALL ERROR('ALPHABETIC CHARACTER IN NUMERICAL'
                          249.000                                         ||' CONSTANT IGNORED');
 59     2    3            250.000                              PUT SKIP;
 60     2    3            251.000                             END;
 61     2    2            252.000                      CALL R_CHAR(CH);
 62     2    2            253.000                     END;
 63     2    1            254.000                     IF DEC_VAL¬=0
 64     2    1            255.000                      THEN FLT = FXD + DEC_VAL/NO_DECS;
 65     2    1            256.000                      ELSE FLT = FXD;
 66     2    1            257.000                     LEX_VAL = RNO_VAL;
 67     2    1            258.000                    END;
 68     2                 259.000             BUF_PTR = BUF_PTR - 1;
 69     2                 260.000        END;
                          261.000
                          262.000
 70     1                 263.000        ERROR  : PROCEDURE(MESSAGE);
 71     2                 264.000                 DCL MESSAGE CHAR(100);
                          265.000
                          266.000            /* ********************************************************
                          267.000               *  PROCEDURE 'ERROR' PRINTS  OUT THE ERROR MESSAGES  *
                          268.000               ********************************************************
                          269.000            */
 72     2                 270.000                 PUT SKIP LIST(BUFFER);
 73     2                 271.000                 PUT SKIP EDIT('+')(COL(BUF_PTR-1),A);
 74     2                 272.000                 PUT SKIP LIST('***   ERROR  *** ',MESSAGE);
```

```
STMT LEVEL NEST

 75     2            273.000            PUT SKIP;
 76     2            274.000    END;
                     275.000
                     276.000
 77     1            277.000    WARNING: PROCEDURE(MESSAGE);
 78     2            278.000             DCL MESSAGE CHAR(100);
                     279.000
                     280.000        /* ************************************************************
                     281.000           *  PROCEDURE 'WARNING' PRINTS  OUT THE WARNING MESSAGES  *
                     282.000           ************************************************************
                     283.000        */
 79     2            284.000             PUT SKIP LIST(BUFFER);
 80     2            285.000             PUT SKIP EDIT('+')(COL(BUF_PTR-1),A);
 81     2            286.000             PUT SKIP LIST('**   WARNING  ** ',MESSAGE);
 82     2            287.000             PUT SKIP;
 83     2            288.000    END;
                     289.000
                     290.000
 84     1            291.000    IHASH  : PROCEDURE(SYMBOL,LEN_OF_SYM) RETURNS(FIXED BINARY);
 85     2            292.000             DCL SYMBOL CHAR(20) VAR,
                     293.000                 M FIXED BIN(31) DEF SYMBOL,
                     294.000                 N FIXED BIN(31),
                     295.000                 LEN_OF_SYM FIXED BIN;
                     296.000
                     297.000        /* ************************************************************
                     298.000           *  PROCEDURE  'IHASH' RETURNS A HASH VALUE  THROUGH ITS NAME  *
                     299.000           ************************************************************
                     300.000        */
 86     2            301.000             N = ABS(M)/LEN_OF_SYM;
 87     2            302.000             RETURN(MOD(N,22));
 88     2            303.000    END;
                     304.000
                     305.000
 89     1            306.000    ENDSTR : PROCEDURE(CH) RETURNS(BIT(1));
 90     2            307.000             DCL CH CHAR(1),
                     308.000                 VALUE BIT(1);
                     309.000
                     310.000        /* ************************************************************
                     311.000           *  PROCEDURE 'ENDSTR' RETURNS THE VALUE TRUE IF END OF STRING  *
                     312.000           *  IS DETECTED ELSE FALSE                                      *
                     313.000           ************************************************************
                     314.000        */
 91     2            315.000             IF CH=''''
 92     2            316.000              THEN DO;
 93     2     1      317.000                    CALL R_CHAR(CH);
 94     2     1      318.000                    IF CH=''''
 95     2     1      319.000                     THEN VALUE = '0'B;
 96     2     1      320.000                     ELSE DO;
 97     2     2      321.000                           BUF_PTR = BUF_PTR - 1;
 98     2     2      322.000                           VALUE = '1'B;
 99     2     2      323.000                          END;
100     2     1      324.000                    END;
101     2            325.000              ELSE VALUE = '0'B;
102     2            326.000             RETURN(VALUE);
```

```
STMT LEVEL NEST
103      2          327.000   END;
                    328.000
                    329.000
104      1          330.000   WR_WS  : PROCEDURE;
                    331.000
                    332.000       /* ***************************************************************
                    333.000          *  PROCEDURE  'WR_WS'  PRINTS  OUT  THE  WORKSPACES  IN  USE  *
                    334.000          ***************************************************************
                    335.000       */
105      2          336.000            PUT SKIP EDIT((IDENTS.IDENT_NAME(I) DO I=WS_BEG TO NO_WS))
                    337.000                     (A,SKIP);
106      2          338.000            PUT SKIP;
107      2          339.000            PUT SKIP EDIT('USER HAS',NO_WS - (WS_BEG-1),' WORKSPACE(S) '
                    340.000                      ||'IN USE')
                    341.000                     (A,F(4),A);
108      2          342.000            PUT SKIP;
109      2          343.000   END;
                    344.000
                    345.000
110      1          346.000   WR_VARS: PROCEDURE;
                    347.000
                    348.000       /* ***************************************************************
                    349.000          *  PROCEDURE  'WR_VARS' PRINTS  OUT  THE  VARIABLES  DECLARED  *
                    350.000          ***************************************************************
                    351.000       */
111      2          352.000            PUT SKIP EDIT((IDENTS.IDENT_NAME(I),IDENTS.INF_FLD(I)
                    353.000                      DO I=VAR_BEG TO NO_VARS))
                    354.000                     (A,F(20,7),SKIP);
112      2          355.000            PUT SKIP;
113      2          356.000            PUT SKIP EDIT('USER HAS',NO_VARS - (VAR_BEG-1),' VARIABLE(S)'
                    357.000                      ||' DECLARED')
                    358.000                     (A,F(4),A);
114      2          359.000            PUT SKIP;
115      2          360.000   END;
                    361.000
                    362.000
116      1          363.000   CL_WS  : PROCEDURE;
                    364.000
                    365.000       /* ***************************************************************
                    366.000          *  PROCEDURE  'CL_WS'  DESTROYS  THE  WORKSPACES  IN  USE  *
                    367.000          ***************************************************************
                    368.000       */
117      2          369.000            PUT SKIP EDIT('THE',NO_WS - (WS_BEG-1),' WORKSPACE(S) IN '
                    370.000                      ||'THE WORKSPACE AREA ')
                    371.000                     (A,F(4),A);
118      2          372.000            IF NO_WS<=WS_BEG
119      2          373.000             THEN PUT EDIT('HAS')(A);
120      2          374.000             ELSE PUT EDIT('HAVE')(A);
121      2          375.000            PUT EDIT(' BEEN CLEARED')(A);
122      2          376.000            PUT SKIP;
123      2          377.000            NO_WS = WS_BEG - 1;
124      2          378.000   END;
                    379.000
                    380.000
```

```
STMT LEVEL NEST

125     1          381.000  CL_VARS: PROCEDURE;
                   382.000
                   383.000      /* ************************************************************
                   384.000         *  PROCEDURE  'WR_WS'  DESTROYS  THE  VARIABLES  DECLARED  *
                   385.000         ************************************************************
                   386.000      */
126     2          387.000           PUT SKIP EDIT('THE',NO_VARS - (VAR_BEG-1),' VARIABLE(S) IN '
                   388.000                        ||'THE VARIABLE AREA ')
                   389.000                  (A,F(4),A);
127     2          390.000           IF NO_VARS<=VAR_BEG
128     2          391.000            THEN PUT EDIT('HAS')(A);
129     2          392.000            ELSE PUT EDIT('HAVE')(A);
130     2          393.000           PUT EDIT(' BEEN CLEARED')(A);
131     2          394.000           PUT SKIP;
132     2          395.000           NO_VARS = VAR_BEG - 1;
133     2          396.000  END;
                   397.000
                   398.000
134     1          399.000    AGAIN: CALL R_CHAR(CH);
                   400.000
                   401.000      /* THE FIRST FOUR CHARACTERS OF SYMBOL ARE SET TO BLANK AS THE
                   402.000         HASH FUNCTION IS DEFINED ON THE FIRST THIRTY-TWO BITS. */
                   403.000
135     1          404.000           SYMBOL = '    ';
136     1          405.000           SYMBOL = '';
137     1          406.000           LEN_OF_SYM = 1;
138     1          407.000           DO WHILE(CH=' ');
139     1     1    408.000            CALL R_CHAR(CH);
140     1     1    409.000           END;
                   410.000
                   411.000      /* +-------------------------------------------------------------+
                   412.000         |  THIS SECTION  ASSIGNS LEXEME VALUES TO STRING  CONSTANTS,  |
                   413.000         |  OPERATORS, SEPARATORS AND BRACKETS.                        |
                   414.000         +-------------------------------------------------------------+
                   415.000      */
141     1          416.000           IF CH<'A'
142     1          417.000            THEN DO;
143     1     1    418.000                  SYMBOL = SYMBOL||CH;
144     1     1    419.000                  TEMP = SUBSTR(BUFFER,BUF_PTR,1);
145     1     1    420.000                  IND = 0;
146     1     1    421.000                  I = INDEX('<>¬$''.@-/*&|:,+=()',CH);
147     1     1    422.000                  IF I>7 THEN II=8; ELSE II=I;
150     1     1    423.000                  GOTO LAB(II);
                   424.000
151     1     1    425.000            LAB(0):
                   426.000                  IF BUF_PTR-1<=BUF_LEN
152     1     1    427.000                   THEN DO;
153     1     2    428.000                         SER_FLG = '1'B;
154     1     2    429.000                         NO_ERRS = NO_ERRS + 1;
155     1     2    430.000                         CALL ERROR('ILLEGAL CHARACTER IGNORED');
156     1     2    431.000                         PUT SKIP;
157     1     2    432.000                        END;
158     1     1    433.000                   ELSE DO;
159     1     2    434.000                         LEX_VAL = EOS_VAL;
```

```
STMT LEVEL NEST

160    1    2                  GOTO FCUND;
161    1    2                END;
162    1    1          GCTO AGAIN;

163    1    1    LAB(1):LAB(2):
                       IF TEMP='='
164    1    1           THEN DO;
165    1    2                 IND = 18;
166    1    2                 SYMBCL = SYMBOL||TEMP;
167    1    2                 CALL R_CHAR(CH);
168    1    2                END;
169    1    1          GOTO LAB(8);

170    1    1    LAB(3):
                       IF TEMP¬='='
171    1    1           THEN DO;
172    1    2                 CALL WARNING('CHARACTER "¬" NOT FOLLOWEC BY '
                                             ||'AN "=" - ONE HAS BEEN '
                                             ||'INSERTED');
173    1    2                 PUT SKIP;
174    1    2                END;
175    1    1           ELSE CALL R_CHAR(CH);
176    1    1          SYMBOL = SYMBOL||'=';
177    1    1          GOTC LAB(8);

178    1    1    LAB(4):
                       IF TEMP=')'
179    1    1           THEN IND = 17;
180    1    1           ELSE IF TEMP¬='('
181    1    1                 THEN DC;
182    1    2                       SER_FLG = '1'B;
183    1    2                       NO_ERRS = NO_ERRS + 1;
184    1    2                       CALL ERROR('CHARACTER "$" NOT FOLLOWED '
                                                   ||'BY AN "(" OR ")" AND IS '
                                                   ||'IGNORED');
185    1    2                       PUT SKIP;
186    1    2                       GOTO AGAIN;
187    1    2                      END;
188    1    1          SYMBOL = SYMBOL||TEMP;
189    1    1          CALL R_CHAR(CH);
190    1    1          GOTC LAB(8);

191    1    1    LAB(5):
                       SYMBOL = '';
192    1    1          LEN_OF_SYM = 0;
193    1    1      L3 : CALL R_CHAR(CH);
194    1    1          IF LEN_CF_SYM>20
195    1    1           THEN DC;
196    1    2                 SER_FLG = '1'B;
197    1    2                 NO_ERRS = NC_ERRS + 1;
198    1    2                 CALL ERROR('IMPLEMENTATION RESTRICTION - '
                                          ||'LENGTH OF CHARACTER STRING '
                                          ||'HAS BEEN TRUNCATED TO 20 '
                                          ||'CHARACTERS');
```

```
STMT LEVEL NEST

199      1    2       489.000            PUT SKIP;
200      1    2       490.000            DO WHILE(¬ENDSTR(CH));
201      1    3       491.000             CALL R_CHAR(CH);
202      1    3       492.000             IF BUF_PTR-1=BUF_LEN & CH¬='-'
203      1    3       493.000              THEN GOTO OUT;
204      1    3       494.000            END;
205      1    2       495.000       OUT : END;
                      496.000
206      1    1       497.000        ELSE
206      1    1       498.000        IF BUF_PTR-1=BUF_LEN & CH¬='-'
207      1    1       499.000         THEN DO;
208      1    2       500.000               SER_FLG = '1'B;
209      1    2       501.000               NO_ERRS = NO_ERRS + 1;
210      1    2       502.000               CALL ERROR('MISSING END QUOTE DETECTED WHEN '
                      503.000                          ||'END OF BUFFER REACHED - '
                      504.000                          ||'CHARACTER STRING IGNORED');
211      1    2       505.000               PUT SKIP;
212      1    2       506.000               GOTO AGAIN;
213      1    2       507.000              END;
                      508.000
214      1    1       509.000         ELSE
214      1    1       510.000         IF ¬ENDSTR(CH)
215      1    1       511.000          THEN DO;
216      1    2       512.000                SYMBOL = SYMBOL||CH;
217      1    2       513.000                LEN_OF_SYM = LEN_OF_SYM + 1;
218      1    2       514.000                GOTO L3;
219      1    2       515.000               END;
220      1    1       516.000       STRING = SYMBOL;
221      1    1       517.000       GOTO LAB(8);
                      518.000
222      1    1       519.000  LAB(6):
                      520.000       IF SUBSTR(BUFFER,BUF_PTR,1)>'Z'
223      1    1       521.000        THEN DO;
224      1    2       522.000              CALL NUMBER;
225      1    2       523.000              GOTO FOUND;
226      1    2       524.000             END;
227      1    1       525.000       GOTO LAB(8);
                      526.000
228      1    1       527.000  LAB(7):
                      528.000       I = INDEX('WVCT',SUBSTR(BUFFER,BUF_PTR,1));
229      1    1       529.000       GOTO LEV(I);
                      530.000
230      1    1       531.000   LEV(0):
                      532.000       GOTO LAB(0);
231      1    1       533.000   LEV(1):
                      534.000       IF SUBSTR(BUFFER,BUF_PTR,10)='WORKSPACES'
232      1    1       535.000        THEN DO;
233      1    2       536.000              CALL WR_WS;
234      1    2       537.000              PUT SKIP;
235      1    2       538.000              BUF_PTR = BUF_PTR + 10;
236      1    2       539.000              GOTO AGAIN;
237      1    2       540.000             END;
238      1    1       541.000        ELSE
238      1    1       542.000        IF SUBSTR(BUFFER,BUF_PTR,9)='WORKSPACE'
```

```
STMT LEVEL NEST

239    1    1                THEN DO;
240    1    2                      CALL WR_WS;
241    1    2                      PUT SKIP;
242    1    2                      BUF_PTR = BUF_PTR + 9;
243    1    2                      GOTO AGAIN;
244    1    2                     END;
245    1    1                ELSE GOTC LAB(0);
246    1    1        LEV(2):
                           IF SUBSTR(BUFFER,BUF_PTR,9)='VARIABLES'
247    1    1               THEN DO;
248    1    2                     CALL WR_VARS;
249    1    2                     PUT SKIP;
250    1    2                     BUF_PTR = BUF_PTR + 9;
251    1    2                     GOTO AGAIN;
252    1    2                    END;
253    1    1               ELSE
253    1    1               IF SUBSTR(BUFFER,BUF_PTR,8)='VARIABLE'
254    1    1                THEN DO;
255    1    2                      CALL WR_VARS;
256    1    2                      PUT SKIP;
257    1    2                      BUF_PTR = BUF_PTR + 8;
258    1    2                      GOTO AGAIN;
259    1    2                     END;
260    1    1                ELSE GOTO LAB(0);
261    1    1        LEV(3):
                           IF SUBSTR(BUFFER,BUF_PTR,15)='CLEARWCRKSPACES'
262    1    1               THEN DO;
263    1    2                     CALL CL_WS;
264    1    2                     PUT SKIP;
265    1    2                     BUF_PTR = BUF_PTR + 15;
266    1    2                     GOTO AGAIN;
267    1    2                    END;
268    1    1               ELSE
268    1    1               IF SUBSTR(BUFFER,BUF_PTR,14)='CLEARWCRKSPACE'
269    1    1                THEN DO;
270    1    2                      CALL CL_WS;
271    1    2                      PUT SKIP;
272    1    2                      BUF_PTR = BUF_PTR + 14;
273    1    2                      GOTO AGAIN;
274    1    2                     END;
275    1    1              IF SUBSTR(BUFFER,BUF_PTR,14)='CLEARVARIABLES'
276    1    1               THEN DO;
277    1    2                     CALL CL_VARS;
278    1    2                     PUT SKIP;
279    1    2                     BUF_PTR = BUF_PTR + 14;
280    1    2                     GOTO AGAIN;
281    1    2                    END;
282    1    1               ELSE
282    1    1               IF SUBSTR(BUFFER,BUF_PTR,13)='CLEARVARIABLE'
283    1    1                THEN DO;
284    1    2                      CALL CL_VARS;
285    1    2                      PUT SKIP;
286    1    2                      BUF_PTR = BUF_PTR + 13;
287    1    2                      GOTO AGAIN;
```

```
STMT LEVEL NEST

288   1   2                        END;
289   1   1                 GCTC LAB(O);
290   1   1          LEV(4):
                            IF SUBSTR(BUFFER,BUF_PTR,4)='TIME'
291   1   1              THEN DO;
292   1   2                    DAY = DATE;
293   1   2                    CLOCK = TIME;
294   1   2                    PUT SKIP EDIT('CLOCK   ',CLOCK,'DATE   ',DAY)
                                         (A,A,X(3),A,A);
295   1   2                    PUT SKIP;
296   1   2                    BUF_PTR = BUF_PTR + 4;
297   1   2                    GOTO AGAIN;
298   1   2                   END;
299   1   1             GOTO LAB(O);

300   1   1          LAB(8):
                        LEX_VAL = OP_S_B(I+IND);

301   1   1             END;
302   1              ELSE

             /* +-------------------------------------------------------------+
                |  THIS SECTION  ASSIGNS LEXEME VALUES TO RESERVED  KEYWORDS   |
                |  AND IDENTIFIERS.                                            |
                +-------------------------------------------------------------+
             */
302   1              IF CH<'0'
303   1               THEN DO;
304   1   1                DC WHILE(CH>='A' | CH='#' | CH='_');
305   1   2                 IF LEN_OF_SYM>20
306   1   2                  THEN DO;
307   1   3                        CALL WARNING('IMPLEMENTATION RESTRICTION - '
                                         ||'LENGTH OF ICENTIFIER HAS '
                                         ||'BEEN TRUNCATED TO 20 '
                                         ||'CHARACTERS');
308   1   3                        PUT SKIP;
309   1   3                        DO WHILE(CH>='A' | CH='#' | CH='_');
310   1   4                         CALL R_CHAR(CH);
311   1   4                        END;
312   1   3                        GOTO L2;
313   1   3                       END;
314   1   2                 SYMBOL = SYMBOL||CH;
315   1   2                 LEN_OF_SYM = LEN_OF_SYM + 1;
316   1   2                 CALL R_CHAR(CH);
317   1   2                END;
318   1   1           L2:  BUF_PTR = BUF_PTR - 1;
319   1   1                LEN_OF_SYM = LEN_OF_SYM - 1;
320   1   1                HASH_VAL = IHASH(SYMBOL,LEN_OF_SYM);

             /* IS SYMBOL A RESERVED KEYWORD?  IF TRUE, CONTROL PASSES TO
                STATEMENT LABELLED 'FOUND'. */

321   1   1                DO I=PCINTER(HASH_VAL) TO POINTER(HASH_VAL+1)-1;
322   1   2                 IF SYMBOL=BASIC_SYM(I).KEYWORD
```

```
STMT LEVEL NEST

323    1   2               THEN DO;
324    1   3                     LEX_VAL = BASIC_SYM(I).KEYWORC_VAL;
325    1   3                     GOTO FOUND;
326    1   3                    END;
327    1   2              END;

         /* SYMBOL IS NOT A RESERVED KEYWORD.  IF IDENTIFIER NAME IS IN
            IN TABLE, CONTROL PASSES TO STATEMENT LABELLED 'FOUND'. */

328    1   1              CID_PSN = ID_PSN;

329    1   1              DO ID_PSN=VAR_BEG TC NO_VARS;
330    1   2               IF SYMBOL=IDENTS(IC_PSN).IDENT_NAME
331    1   2                THEN DO;
332    1   3                     LEX_VAL = IDENTS(ID_PSN).IDENT_VAL;
333    1   3                     GOTO FOUND;
334    1   3                    END;
335    1   2              END;

336    1   1              DO IC_PSN=WS_BEG TC NO_WS;
337    1   2               IF SYMBOL=IDENTS(ID_PSN).IDENT_NAME
338    1   2                THEN DO;
339    1   3                     LEX_VAL = IDENTS(ID_PSN).IDENT_VAL;
340    1   3                     GOTO FOUND;
341    1   3                    END;
342    1   2              END;

343    1   1              CO ID_PSN=1 TO NC_OTHS;
344    1   2               IF SYMBOL=IDENTS(ID_PSN).IDENT_NAME
345    1   2                THEN DO;
346    1   3                     LEX_VAL = IDENTS(ID_PSN).IDENT_VAL;
347    1   3                     GOTO FOUND;
348    1   3                    END;
349    1   2              END;

         /* IDENTIFIER NAME NOT FOUND IN TABLE.  IT IS ADDEC TO THE END
            OF THE LIST. */

350    1   1              IF NC_CTHS=MAX_OTH_IDENTS
351    1   1               THEN DO;
352    1   2                    SER_FLG = '1'B;
353    1   2                    NO_ERRS = NC_ERRS + 1;
354    1   2                    CALL ERROR('IMPLEMENTATION RESTRICTION - '
                                            ||'TOO MANY IDENTIFIERS '
                                            ||'USED');
355    1   2                    PUT SKIP;
356    1   2                    ID_OFLW = '1'B;
357    1   2                    ID_PSN = 0;
358    1   2                    LEX_VAL = IDENTS(ID_PSN).IDENT_VAL;
359    1   2                   END;
360    1   1               ELSE DO;
361    1   2                    NO_OTHS = IC_PSN;
362    1   2                    IDENTS(NO_OTHS).IDENT_NAME = SYMBOL;
363    1   2                    IDENTS(NO_OTHS).IDENT_VAL = IDENT_LEX_VAL;
```

```
STMT LEVEL NEST

364      1    2      705.000                          IDENTS(NO_OTHS).INF_FLD = 0;
365      1    2      706.000                          LEX_VAL = IDENT_LEX_VAL;
366      1    2      707.000                         END;
                     708.000
367      1    1      709.000     FOUND:         END;
                     710.000
368      1           711.000                ELSE CALL NUMBER;
                     712.000
369      1           713.000  END;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
		ABS	GENERIC,BUILT-IN FUNCTION 86
134		AGAIN	STATEMENT LABEL CONSTANT 162,186,212,236,243,251,258,266,273,280,287,297
4		BASIC_SYM	(41)STATIC,STRUCTURE,STRUCTURE
2	*********	BUF_LEN	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 12,14,14,14,17,20,22,151,202,206
2	*********	BUF_PTR	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 12,14,14,23,26,27,27,68,68,73,80,97,97,144,151,202,206,222,228,231 235,235,238,242,242,246,250,250,253,257,257,261,265,265,268,272,272 275,279,279,282,286,286,290,296,296,318,318
2		BUFFER	STATIC,EXTERNAL,UNALIGNED,STRING(121),CHARACTER,VARYING 14,16,17,18,20,22,26,72,79,144,222,228,231,238,246,253,261,268,275 282,290
		CDOUT	FILE,EXTERNAL 18,19
90		CH	PARAMETER,UNALIGNED,STRING(1),CHARACTER 89,91,93,94
11		CH	PARAMETER,UNALIGNED,STRING(1),CHARACTER 10,26
9		CH	AUTOMATIC,UNALIGNED,STRING(1),CHARACTER 32,33,34,41,43,46,49,50,52,61,134,138,139,141,143,146,167,175,189 193,200,201,202,206,214,216,302,304,304,304,309,309,309,310,314,316
125		CL_VARS	ENTRY,DECIMAL,FLOAT(SINGLE) 277,284
116		CL_WS	ENTRY,DECIMAL,FLOAT(SINGLE) 263,270
2		CLOCK	STATIC,EXTERNAL,UNALIGNED,STRING(8),CHARACTER 293,294
		DATE	BUILT-IN FUNCTION 292
2		DAY	STATIC,EXTERNAL,UNALIGNED,STRING(8),CHARACTER 292,294
30		DEC_VAL	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(DOUBLE) 47,52,52,63,64

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
89		ENDSTR	ENTRY,STRING(1),BIT 200,214
2	*********	EOS_VAL	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 159
70		ERROR	ENTRY,DECIMAL,FLOAT(SINGLE) 38,58,155,184,198,210,354
8		FALSE	AUTOMATIC,STRUCTURE,STRUCTURE
2		FLT	STATIC,EXTERNAL,ALIGNED,DECIMAL,FLOAT(DOUBLE) 64,65
367		FOUND	STATEMENT LABEL CONSTANT 160,225,325,333,340,347
2		FXD	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(31,0) 31,34,34,64,65
9	*********	HASH_VAL	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 320,321,321
	*********	I	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 105,105,111,111,111,146,147,149,228,229,300,321,322,324
2		ID_OFLW	STATIC,EXTERNAL,UNALIGNED,STRING(1),BIT 356
2	*********	ID_PSN	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 328,329,330,332,336,337,339,343,344,346,357,358,361
7	*********	IDENT_LEX_VAL	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 363,365
3		IDENT_NAME	IN IDENTS(0:40),STATIC,EXTERNAL,UNALIGNED,STRING(20),CHARACTER 105,111,330,337,344,362
3	*********	IDENT_VAL	IN IDENTS(0:40),STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 332,339,346,358,363
3		IDENTS	(0:40)STATIC,EXTERNAL,STRUCTURE,STRUCTURE
84	*********	IHASH	ENTRY,BINARY,FIXED(15,0) 320
	*********	II	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 148,149,150
	*********	IND	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 145,165,179,300
		INDEX	GENERIC,BUILT-IN FUNCTION 146,228

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
3		INF_FLD	IN IDENTS(0:40),STATIC,EXTERNAL,ALIGNED,DECIMAL,FLOAT(DOUBLE) 111,364
2	*********	INT_VAL	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 44
4		KEYWORD	IN BASIC_SYM(41),STATIC,UNALIGNED,INITIAL,STRING(20),CHARACTER, VARYING 322
4	*********	KEYWORD_VAL	IN BASIC_SYM(41),STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 324
16		L1	STATEMENT LABEL CONSTANT 21
318		L2	STATEMENT LABEL CONSTANT 312
193		L3	STATEMENT LABEL CONSTANT 218
9		LAB	(0:8)AUTOMATIC,INITIAL,LABEL 151,163,163,170,178,191,222,228,300,150,169,177,190,221,227,230,245 260,289,299
85	*********	LEN_OF_SYM	PARAMETER,ALIGNED,BINARY,FIXED(15,0) 84,86
9	*********	LEN_OF_SYM	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 137,192,194,217,217,305,315,315,319,319,320
		LENGTH	GENERIC,BUILT-IN FUNCTION 17
9		LEV	(0:4)AUTOMATIC,INITIAL,LABEL 230,231,246,261,290,229
1	*********	LEX_ANL	ENTRY,BINARY,FIXED(15,0)
2	*********	LEX_VAL	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 44,66,159,300,324,332,339,346,358,365
85		M	AUTOMATIC,DEFINED,ALIGNED,BINARY,FIXED(31,0) 86
7	*********	MAX_OTH_IDENTS	STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 350
78		MESSAGE	PARAMETER,UNALIGNED,STRING(100),CHARACTER 77,81
71		MESSAGE	PARAMETER,UNALIGNED,STRING(100),CHARACTER

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
			70,74
		MCD	GENERIC,BUILT-IN FUNCTION 87
85		N	AUTOMATIC,ALIGNED,BINARY,FIXED(31,0) 86,87
8		NIL	IN FALSE,AUTOMATIC,ALIGNED,BINARY,FIXED(31,0)
30		NC_DECS	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(DOUBLE) 48,53,53,64
2	*********	NO_ERRS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 37,37,57,57,154,154,183,183,197,197,209,209,353,353
2	*********	NO_OTHS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 343,350,361,362,363,364
2	*********	NO_VARS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 111,113,126,127,132,329
2	*********	NO_WS	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 105,107,117,118,123,336
29	*********	NUMBER	ENTRY,BINARY,FIXED(15,0) 224,368
2	*********	OID_PSN	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 328
6	*********	OP_S_B	(21)STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 300
205		OUT	STATEMENT LABEL CONSTANT 203
5	*********	POINTER	(0:22)STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 321,321
10		R_CHAR	ENTRY,DECIMAL,FLOAT(SINGLE) 41,46,61,93,134,139,167,175,189,193,201,310,316
2	*********	RNO_VAL	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 66
2		SER_FLG	STATIC,EXTERNAL,UNALIGNED,STRING(1),BIT 36,56,153,182,196,208,352
2		SOURCE	FILE,EXTERNAL,RECORD,INPUT,ENVIRONMENT(U(120)) 16
		SPRINT	FILE,EXTERNAL 39,59,72,73,74,75,79,80,81,82,105,106,107,108,111,112,113,114,117

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		119,120,121,122,126,128,129,130,131,156,173,185,199,211,234,241,249 256,264,271,278,285,294,295,308,355
2	STRING	STATIC,EXTERNAL,UNALIGNED,STRING(20),CHARACTER,VARYING 220
	SUBSTR	GENERIC,BUILT-IN FUNCTION 14,20,22,26,144,222,228,231,238,246,253,261,268,275,282,290
9	SWITCH1	AUTOMATIC,UNALIGNED,STRING(1),BIT
9	SWITCH2	AUTOMATIC,UNALIGNED,STRING(1),BIT
85	SYMBOL	PARAMETER,UNALIGNED,STRING(20),CHARACTER,VARYING 84
8	SYMBOL	IN FALSE,AUTOMATIC,UNALIGNED,STRING(20),CHARACTER,VARYING 135,136,143,143,166,166,176,176,188,188,191,216,216,220,314,314,320 322,330,337,344,362
9	TEMP	AUTOMATIC,UNALIGNED,STRING(1),CHARACTER 144,163,166,170,178,180,188
	TIME	BUILT-IN FUNCTION 293
90	VALUE	AUTOMATIC,UNALIGNED,STRING(1),BIT 95,98,101,102
2 *********	VAR_BEG	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 111,113,126,127,132,329
77	WARNING	ENTRY,DECIMAL,FLOAT(SINGLE) 172,307
110	WR_VARS	ENTRY,DECIMAL,FLOAT(SINGLE) 248,255
104	WR_WS	ENTRY,DECIMAL,FLOAT(SINGLE) 233,240
2 *********	WS_BEG	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 105,107,117,118,123,336

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
4	BASIC_SYM	902
8	FALSE	24
3	IDENTS	1310
9	LAB	72
9	LEV	40
6	OP_S_B	42
5	POINTER	46

STORAGE REQUIREMENTS.

THE STORAGE AREA FOR THE PROCEDURE LABELLED LEX_ANL IS 688 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED R_CHAR IS 208 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED NUMBER IS 260 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED ERROR IS 196 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED WARNING IS 196 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED IHASH IS 208 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED ENDSTR IS 200 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED WR_WS IS 208 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED WR_VARS IS 212 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED CL_WS IS 184 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED CL_VARS IS 184 BYTES LONG.
THE PROGRAM CSECT IS NAMED LEX_ANL AND IS 11326 BYTES LONG.
THE STATIC CSECT IS NAMED LEX_ANLA AND IS 5856 BYTES LONG.

STATISTICS SOURCE RECORDS = 713,PROG TEXT STMNTS = 369,OBJECT BYTES = 11326

COMPILER DIAGNOSTICS.

ERRORS.

IEM1105I 85 THE DATA CHARACTERISTICS OF M DECLARED IN STATEMENT NUMBER 85 DO NOT MATCH THOSE OF THE DEFINING BASE.

WARNINGS.

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS. SCARDS/SPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM0526I 1 OPTION MAIN HAS NOT BEEN SPECIFIED FOR THE EXTERNAL PROCEDURE, STATEMENT NUMBER 1

IEM0764I ONE OR MORE FIXED BINARY ITEMS OF PRECISION 15 OR LESS HAVE BEEN GIVEN HALFWORD STORAGE. THEY ARE FLAGGED '*********' IN THE XREF/ATR LIST.

IEM1790I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS 34, 52.

END OF DIAGNOSTICS.

COMPILE TIME 25.82 SECS

ELAPSED TIME 10.09 MINS

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

DIAG

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
  EBCDIC
  CHAR60
NOMACRO
  SOURCE2
NOMACDCK
  COMP
  SOURCE
  ATR
  XREF
NOEXTREF
NOLIST
NOLOAD
  DECK
  FLAGW
  STMT
  SIZE=01P
  LINECNT=060
  OPT=01
  SORMGIN=(001,072)
NOEXTDIC
  NEST
  OPLIST
  SYNCHKS
  DIAG
```

```
*OPTIONS IN EFFECT*     EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,NOLOAD,
*OPTIONS IN EFFECT*     DECK,FLAGW,STMT,SIZE=01P,LINECNT=060,OPT=01,SORMGIN=(001,072),NOEXTDIC,
*OPTIONS IN EFFECT*     NEST,OPLIST,SYNCHKS,DIAG
```

```
STMT LEVEL NEST
  1                1.000  INTERPR : PROCEDURE;
                   2.000
                   3.000       /* ****************************************************************
                   4.000          ****************************************************************
                   5.000          *                PRINTING  OF  CODING  TABLES                  *
                   6.000          *                                                              *
                   7.000          *                              FOR                             *
                   8.000          *                                                              *
                   9.000          *                   DATA  SUBLANGUAGE  ALPHA                   *
                  10.000          ****************************************************************
                  11.000          ****************************************************************
                  12.000       */
  2      1         13.000            DCL 1 RECORD EXTERNAL,
                  14.000                 2 NO_RV FIXED BIN,
                  15.000                 2 RA_TAB(10), 3(RNAME,LRNAME,QUANT,WCOMP) FIXED BIN,
                  16.000                 2 (ST_TAB,LRN_TAB,WN_TAB,RN_TAB,Q_TAB) FIXED BIN,
                  17.000                 2 NO_GTV FIXED BIN,
                  18.000                 2 GT_TAB(10), 3(FUNCT,ALIST,ALISTPTR,LRNAME,ANAME) FIXED
                  19.000                                                                    BIN,
                  20.000                 2 NO_HTV FIXED BIN,
                  21.000                 2 HT_TAB(10), 3(LRNAME,ANAME) FIXED BIN,
                  22.000                 2 NO_DT FIXED BIN,
                  23.000                 2 DT_TAB(10), 3(LRNAME1,ANAME1,LRNAME2,ANAME2,RELOP,
                  24.000                                 WCOMP,TCOMP) FIXED BIN,
                  25.000                 2 DTOV FIXED BIN,
                  26.000                 2 DTOV_TAB(5), 3(RNAME,LRNAME,ANAME1,ANAME2,ATYPE,
                  27.000                                  APOSN1,APOSN2,RELOP,V#,WCOMP,TCOMP)
                  28.000                                 FIXED BIN,
                  29.000                 2 NO_MT FIXED BIN,
                  30.000                 2 FN_MT_TAB(10), 3(FUNCT,ALIST,ALISTPTR,RNAME,LRNAME,
                  31.000                                    ANAME,APOSN,RELOP,V#,WCOMP,TCOMP,
                  32.000                                    CONTYPE,CONLEN,CONPTR) FIXED BIN,
                  33.000                 2 NO_OV FIXED BIN,
                  34.000                 2 OR_TAB(5), 3(ORDER,LRNAME,ANAME) FIXED BIN,
                  35.000                 2 NO_WPV FIXED BIN,
                  36.000                 2 WP_TAB(5), 3(WCOMP1,WCOMP2,OPER) FIXED BIN,
                  37.000                 2 NO_ALV FIXED BIN,
                  38.000                 2 AL_TAB(10) FIXED BIN,
                  39.000                 2 NO_ATT FIXED BIN,
                  40.000                 2 ATT_TAB(10), 3(ANAME,KTYPE,ATYPE,ALEN) FIXED BIN,
                  41.000                 2 NO_IDV FIXED BIN,
                  42.000                 2 ID_TAB(10) FIXED BIN,
                  43.000                 2 NO_ASSV FIXED BIN,
                  44.000                 2 ASS_TAB(30), 3(OP1,OP2,OPER,IOP1,IOP2) FIXED BIN,
                  45.000                 2 NO_VAR FIXED BIN,
                  46.000                 2 VAR_TAB(10), 3(RNAME,LRNAME,V#) FIXED BIN,
                  47.000                 2 (NO_FB31,NO_FLT16,NO_CHAR) FIXED BIN,
                  48.000                 2 FB31(10) FIXED BIN(31),
                  49.000                 2 FLT16(10) FLOAT(16),
                  50.000                 2 CHARS(10) CHAR(20);
                  51.000
  3      1         52.000            DCL 1 IDENTS(0:40) EXTERNAL,
                  53.000                 2 IDENT_NAME CHAR(20),
                  54.000                 2 IDENT_VAL FIXED BIN,
                  55.000                 2 INF_FLD FLOAT(16);
                  56.000
```

```
STMT LEVEL NEST
   4     1              57.000            DCL WS_VAL FIXED BIN EXTERNAL,
                        58.000                ROUTINE(1:9) LABEL;
                        59.000
                        60.000
   5     1              61.000    PRA_TAB: PROCEDURE;
                        62.000
   6     2              63.000             PUT FILE(CDOUT) EDIT('RA_TAB')(COL(3),A);
   7     2              64.000             PUT FILE(CDOUT) SKIP EDIT('RNAME','LRNAME','QUANT','WCOMP')
                        65.000                                 (COL(8),A,X(4),3(A,X(5)));
   8     2              66.000             PUT FILE(CDOUT) SKIP EDIT((RA_TAB(I) DO I=1 TO NO_RV))
                        67.000                                 (4(F(10)),SKIP);
   9     2              68.000             PUT FILE(CDOUT) SKIP(2);
  10     2              69.000    END;
                        70.000
                        71.000
  11     1              72.000    PST_TAB: PROCEDURE;
                        73.000
  12     2              74.000             PUT FILE(CDOUT) EDIT('ST_TAB')(COL(3),A);
  13     2              75.000             PUT FILE(CDOUT) EDIT(ST_TAB)(F(10));
  14     2              76.000             PUT FILE(CDOUT) SKIP(3);
  15     2              77.000    END;
                        78.000
                        79.000
  16     1              80.000    PWN_TAB: PROCEDURE;
                        81.000
  17     2              82.000             PUT FILE(CDOUT) EDIT('WN_TAB')(COL(3),A);
  18     2              83.000             PUT FILE(CDOUT) EDIT(WN_TAB)(F(10));
  19     2              84.000             PUT FILE(CDOUT) SKIP(3);
  20     2              85.000    END;
                        86.000
                        87.000
  21     1              88.000    PLRN_TAB: PROCEDURE;
                        89.000
  22     2              90.000             PUT FILE(CDOUT) EDIT('LRN_TAB')(COL(3),A);
  23     2              91.000             PUT FILE(CDOUT) EDIT(LRN_TAB)(F(9));
  24     2              92.000             PUT FILE(CDOUT) SKIP(3);
  25     2              93.000    END;
                        94.000
                        95.000
  26     1              96.000    PRN_TAB: PROCEDURE;
                        97.000
  27     2              98.000             PUT FILE(CDOUT) EDIT('RN_TAB')(COL(3),A);
  28     2              99.000             PUT FILE(CDOUT) EDIT(RN_TAB)(F(10));
  29     2             100.000             PUT FILE(CDOUT) SKIP(3);
  30     2             101.000    END;
                       102.000
                       103.000
  31     1             104.000    PGT_TAB: PROCEDURE;
                       105.000
  32     2             106.000             PUT FILE(CDOUT) EDIT('Q_TAB')(COL(3),A);
  33     2             107.000             PUT FILE(CDOUT) EDIT(Q_TAB)(F(11));
  34     2             108.000             PUT FILE(CDOUT) SKIP(3);
  35     2             109.000             PUT FILE(CDOUT) EDIT('GT_TAB')(COL(3),A);
  36     2             110.000             PUT FILE(CDOUT) SKIP EDIT('FUNCT','ALIST','ALISTPTR',
```

```
STMT LEVEL NEST
                    111.000                                  'LRNAME','ANAME')
                    112.000                                 (CCL(8),A,X(4),A,X(4),A,X(3),A,
                    113.000                                  X(4),A);
 37      2          114.000          PUT FILE(CDOUT) SKIP EDIT((GT_TAB(I) DO I=1 TO NO_GTV))
                    115.000                                 (5(F(10)),SKIP);
 38      2          116.000          PUT FILE(CDOUT) SKIP(2);
 39      2          117.000   END;
                    118.000
                    119.000
 40      1          120.000   PHT_TAB: PROCEDURE;
                    121.000
 41      2          122.000          PUT FILE(CDOUT) EDIT('HT_TAB')(COL(3),A);
 42      2          123.000          PUT FILE(CDOUT) SKIP EDIT('LRNAME','ANAME')
                    124.000                                 (COL(8),2(A,X(5)));
 43      2          125.000          PUT FILE(CDOUT) SKIP EDIT((HT_TAB(I) DO I=1 TO NO_HTV))
                    126.000                                 (COL(2),2(F(10)),SKIP);
 44      2          127.000          PUT FILE(CDOUT) SKIP(2);
 45      2          128.000   END;
                    129.000
                    130.000
 46      1          131.000   PQ_TABS: PROCEDURE;
                    132.000
 47      2          133.000          PUT FILE(CDOUT) EDIT('FN_MT_TAB')(COL(3),A);
 48      2          134.000          IF NO_MT¬=0
 49      2          135.000           THEN PUT FILE(CDOUT) SKIP EDIT('FUNCT','ALIST','ALISTPTR',
                    136.000                                        'RNAME','LRNAME','ANAME',
                    137.000                                        ' RELOP',' WCOMP',' TCOMP',
                    138.000                                        'CONTYPE','CONLEN','CONPTR')
                    139.000                                       (COL(8),12(A,X(2)));
 50      2          140.000          PUT FILE(CDOUT) SKIP EDIT((FN_MT_TAB.FUNCT(I),
                    141.000                                    FN_MT_TAB.ALIST(I),
                    142.000                                    FN_MT_TAB.ALISTPTR(I),
                    143.000                                    FN_MT_TAB.RNAME(I),
                    144.000                                    FN_MT_TAB.LRNAME(I),
                    145.000                                    FN_MT_TAB.ANAME(I),
                    146.000                                    FN_MT_TAB.RELOP(I),
                    147.000                                    FN_MT_TAB.WCOMP(I),
                    148.000                                    FN_MT_TAB.TCOMP(I),
                    149.000                                    FN_MT_TAB.CONTYPE(I),
                    150.000                                    FN_MT_TAB.CONLEN(I),
                    151.000                                    FN_MT_TAB.CONPTR(I)
                    152.000                                    DO I=1 TO NO_MT))
                    153.000                                   (COL(3),12(F(8)),SKIP);
 51      2          154.000          PUT FILE(CDOUT) SKIP(2);
 52      2          155.000          PUT FILE(CDOUT) EDIT('DT_TAB')(COL(3),A);
 53      2          156.000          IF NO_DT¬=0
 54      2          157.000           THEN PUT FILE(CDOUT) SKIP EDIT('LRNAME1','ANAME1','LRNAME2',
                    158.000                                        ' ANAME2',' RELOP',
                    159.000                                        '   WCOMP','  TCOMP')
                    160.000                                       (COL(8),7(A,X(3)));
 55      2          161.000          PUT FILE(CDOUT) SKIP EDIT((DT_TAB(I) DO I=1 TO NO_DT))
                    162.000                                     (COL(2),7(F(10)),SKIP);
 56      2          163.000          PUT FILE(CDOUT) SKIP(2);
 57      2          164.000          PUT FILE(CDOUT) EDIT('DTOV_TAB')(COL(3),A);
```

```
STMT LEVEL NEST

 58     2          165.000          IF DTOV¬=0
 59     2          166.000           THEN PUT FILE(CDOUT) SKIP EDIT('RNAME','LRNAME','ANAME1',
                   167.000                                        'ANAME2','RELOP','  WCOMP',
                   168.000                                        ' TCOMP')
                   169.000                                       (COL(8),7(A,X(4)));
 60     2          170.000          PUT FILE(CDOUT) SKIP EDIT((DTOV_TAB.RNAME(I),
                   171.000                                    DTOV_TAB.LRNAME(I),
                   172.000                                    DTOV_TAB.ANAME1(I),
                   173.000                                    DTOV_TAB.ANAME2(I),
                   174.000                                    DTOV_TAB.RELOP(I),
                   175.000                                    DTOV_TAB.WCOMP(I),
                   176.000                                    DTOV_TAB.TCOMP(I)
                   177.000                                    DO I=1 TO DTOV))
                   178.000                                   (7(F(10)),SKIP);
 61     2          179.000          PUT FILE(CDOUT) SKIP(2);
 62     2          180.000          PUT FILE(CDOUT) EDIT('WP_TAB')(COL(3),A);
 63     2          181.000          IF NO_WPV¬=0
 64     2          182.000           THEN PUT FILE(CDOUT) SKIP EDIT('WCOMP1',' WCOMP2','  OPER')
                   183.000                                       (COL(8),4(A,X(3)));
 65     2          184.000          PUT FILE(CDOUT) SKIP EDIT((WP_TAB(I) DO I=1 TO NO_WPV))
                   185.000                                   (COL(2),3(F(10)),SKIP);
 66     2          186.000          PUT FILE(CDOUT) SKIP(2);
 67     2          187.000    END;
                   188.000
                   189.000
 68     1          190.000    POR_TAB: PROCEDURE;
                   191.000
 69     2          192.000          PUT FILE(CDOUT) EDIT('OR_TAB')(COL(3),A);
 70     2          193.000          IF NO_OV¬=0
 71     2          194.000           THEN PUT FILE (CDOUT) SKIP EDIT('ORDER','LRNAME','ANAME')
                   195.000                                       (COL(8),3(A,X(5)));
 72     2          196.000          PUT FILE(CDOUT) SKIP EDIT((OR_TAB(I) DO I=1 TO NO_OV))
                   197.000                                   (COL(2),3(F(10)),SKIP);
 73     2          198.000          PUT FILE(CDOUT) SKIP(2);
 74     2          199.000    END;
                   200.000
                   201.000
 75     1          202.000    PAL_TAB: PROCEDURE;
                   203.000
 76     2          204.000          PUT FILE(CDOUT) EDIT('AL_TAB')(COL(3),A);
 77     2          205.000          PUT FILE(CDOUT) SKIP EDIT((AL_TAB(I) DO I=1 TO NO_ALV))
                   206.000                                   (F(10),SKIP);
 78     2          207.000          PUT FILE(CDOUT) SKIP(2);
 79     2          208.000    END;
                   209.000
                   210.000
 80     1          211.000    PAT_TAB: PROCEDURE;
                   212.000
 81     2          213.000          PUT FILE(CDOUT) EDIT('ATT_TAB')(COL(3),A);
 82     2          214.000          PUT FILE (CDOUT) SKIP EDIT('ANAME','KTYPE','ATYPE','ALEN')
                   215.000                                   (COL(8),4(A,X(5)));
 83     2          216.000          PUT FILE(CDOUT) SKIP EDIT((ATT_TAB(I) DO I=1 TO NO_ATT))
                   217.000                                   (4(F(10)),SKIP);
 84     2          218.000          PUT FILE(CDOUT) SKIP(2);
```

```
STMT LEVEL NEST
 85     2          219.000   END;
                   220.000
                   221.000
 86     1          222.000   PID_TAB: PROCEDURE;
                   223.000
 87     2          224.000             PUT FILE(CDOUT) EDIT('ID_TAB')(COL(3),A);
 88     2          225.000             PUT FILE(CDOUT) SKIP EDIT((ID_TAB(I) DO I=1 TO NO_IDV))
                   226.000                                 (F(10),SKIP);
 89     2          227.000             PUT FILE(CDOUT) SKIP(2);
 90     2          228.000   END;
                   229.000
                   230.000
 91     1          231.000   PAS_TAB: PROCEDURE;
                   232.000
 92     2          233.000             PUT FILE(CDOUT) EDIT('ASS_TAB')(COL(3),A);
 93     2          234.000             PUT FILE(CDOUT)SKIP EDIT('OP1','OP2',' OPER',' IOP1',' IOP2')
                   235.000                                 (COL(8),A,X(8),5(A,X(5)));
 94     2          236.000             PUT FILE(CDOUT) SKIP EDIT((ASS_TAB(I) DO I=1 TO NO_ASSV))
                   237.000                                 (F(9),X(1),4(F(10)),SKIP);
 95     2          238.000             PUT FILE(CDOUT) SKIP(2);
 96     2          239.000   END;
                   240.000
                   241.000
 97     1          242.000             PUT FILE(CDOUT) EDIT('CODING TABLES')(COL(2),A);
 98     1          243.000             PUT FILE(CDOUT) EDIT('-------------')(COL(2),A);
 99     1          244.000             PUT FILE(CDOUT) SKIP;
                   245.000
100     1          246.000             IF ST_TAB=WS_VAL
101     1          247.000              THEN DO;
102     1     1    248.000                    CALL PST_TAB;
103     1     1    249.000                    CALL PAS_TAB;
104     1     1    250.000                    PUT SKIP;
105     1     1    251.000                    RETURN;
106     1     1    252.000                   END;
107     1          253.000              ELSE GOTO ROUTINE(MOD(ST_TAB,100));
                   254.000
                   255.000
108     1          256.000             ROUTINE(1):
                   257.000                   CALL PRA_TAB;
109     1          258.000                   CALL PST_TAB;
110     1          259.000                   CALL PWN_TAB;
111     1          260.000                   CALL PGT_TAB;
112     1          261.000                   CALL PQ_TABS;
113     1          262.000                   CALL POR_TAB;
114     1          263.000                   PUT SKIP;
115     1          264.000                   RETURN;
                   265.000
                   266.000
116     1          267.000             ROUTINE(2):
                   268.000                   CALL PRA_TAB;
117     1          269.000                   CALL PST_TAB;
118     1          270.000                   CALL PLRN_TAB;
119     1          271.000                   CALL PQ_TABS;
120     1          272.000                   PUT SKIP;
```

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STMT LEVEL NEST

121      1              273.000              RETURN;
                        274.000
122      1              275.000          ROUTINE(3):
                        276.000              CALL PST_TAB;
123      1              277.000              CALL PRN_TAB;
124      1              278.000              CALL PAL_TAB;
125      1              279.000              PUT SKIP;
126      1              280.000              RETURN;
                        281.000
127      1              282.000          ROUTINE(4):
                        283.000              CALL PRA_TAB;
128      1              284.000              CALL PST_TAB;
129      1              285.000              CALL PWN_TAB;
130      1              286.000              CALL PHT_TAB;
131      1              287.000              CALL PG_TABS;
132      1              288.000              CALL PCR_TAB;
133      1              289.000              PUT SKIP;
134      1              290.000              RETURN;
                        291.000
135      1              292.000          ROUTINE(5):
                        293.000              CALL PST_TAB;
136      1              294.000              PUT SKIP;
137      1              295.000              RETURN;
                        296.000
138      1              297.000          ROUTINE(7):
                        298.000              CALL PST_TAB;
139      1              299.000              CALL PWN_TAB;
140      1              300.000              CALL PRN_TAB;
141      1              301.000              CALL PAL_TAB;
142      1              302.000              CALL PCR_TAB;
143      1              303.000              PUT SKIP;
144      1              304.000              RETURN;
                        305.000
145      1              306.000          ROUTINE(8):
                        307.000              CALL PST_TAB;
146      1              308.000              CALL PRN_TAB;
147      1              309.000              CALL PAT_TAB;
148      1              310.000              PUT SKIP;
149      1              311.000              RETURN;
                        312.000
150      1              313.000          ROUTINE(9):
                        314.000              CALL PST_TAB;
151      1              315.000              CALL PID_TAB;
152      1              316.000              PUT SKIP;
                        317.000
153      1              318.000  END;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
2	********* AL_TAB	(10)IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 77
2	********* ALEN	IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ALIST	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	********* ALIST	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ALISTPTR	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	********* ALISTPTR	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ANAME	IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ANAME	IN OR_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ANAME	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	********* ANAME	IN HT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ANAME	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ANAME1	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 60
2	********* ANAME1	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ANAME2	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 60
2	********* ANAME2	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* APOSN	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		(15,0)
2	********* APOSN1	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* APOSN2	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	ASS_TAB	(30)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE 94
2	ATT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE 83
2	********* ATYPE	IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* ATYPE	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
	CDOUT	FILE,EXTERNAL 6,7,8,9,12,13,14,17,18,19,22,23,24,27,28,29,32,33,34,35,36,37,38,41 42,43,44,47,49,50,51,52,54,55,56,57,59,60,61,62,64,65,66,69,71,72,73 76,77,78,81,82,83,84,87,88,89,92,93,94,95,97,98,99
2	CHARS	(10)IN RECORD,STATIC,EXTERNAL,UNALIGNED,STRING(20),CHARACTER
2	********* CCNLEN	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	********* CONPTR	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	********* CONTYPE	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	DT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE 55
2	********* DTOV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 58,60
2	DTOV_TAB	(5)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
2	FB31	(10)IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(31,0)
2	FLT16	(10)IN RECORD,STATIC,EXTERNAL,ALIGNED,DECIMAL,FLOAT(DOUBLE)
2	FN_MT_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
2	********* FUNCT	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED

```
DCL NO.          IDENTIFIER                ATTRIBUTES AND REFERENCES

                                           (15,0)
                                           50

2      ********* FUNCT                     IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)

2                GT_TAB                    (10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
                                           37

2                HT_TAB                    (10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
                                           43

       ********* I                         AUTOMATIC,ALIGNED,BINARY,FIXED(15,0)
                                           8,8,37,37,43,43,50,50,50,50,50,50,50,50,50,50,50,50,55,55,60,60
                                           60,60,60,60,60,60,65,65,72,72,77,77,83,83,88,88,94,94

2      ********* ID_TAB                    (10)IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
                                           88

3                IDENT_NAME                IN IDENTS(0:40),STATIC,EXTERNAL,UNALIGNED,STRING(20),CHARACTER

3      ********* IDENT_VAL                 IN IDENTS(0:40),STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)

3                IDENTS                    (0:40)STATIC,EXTERNAL,STRUCTURE,STRUCTURE

3                INF_FLD                   IN IDENTS(0:40),STATIC,EXTERNAL,ALIGNED,DECIMAL,FLOAT(DOUBLE)

1      ********* INTERPR                   ENTRY,BINARY,FIXED(15,C)

2      ********* IOP1                      IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)

2      ********* IOP2                      IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)

2      ********* KTYPE                     IN ATT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)

2      ********* LRN_TAB                   IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
                                           23

2      ********* LRNAME                    IN VAR_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)

2      ********* LRNAME                    IN OR_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)

2      ********* LRNAME                    IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)
                                           50

2      ********* LRNAME                    IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED
                                           (15,0)
                                           60
```

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
2	********* LRNAME	IN HT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* LRNAME	IN GT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* LRNAME	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* LRNAME1	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* LRNAME2	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
	MOD	GENERIC,BUILT-IN FUNCTION 107
2	********* NC_ALV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 77
2	********* NO_ASSV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 94
2	********* NO_ATT	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 83
2	********* NO_CHAR	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
2	********* NO_DT	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 53,55
2	********* NO_FB31	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
2	********* NO_FLT16	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
2	********* NO_GTV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 37
2	********* NO_HTV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 43
2	********* NO_IDV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 88
2	********* NO_MT	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 48,50
2	********* NO_OV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 70,72
2	********* NO_RV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 8

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
2	********* NC_VAR	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0)
2	********* NC_WPV	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 63,65
2	********* OP1	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* OP2	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* OPER	IN ASS_TAB(30) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* OPER	IN WP_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	OR_TAB	(5)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE 72
2	********* ORDER	IN OR_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
75	PAL_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 124,141
91	PAS_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 103
80	PAT_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 147
31	PGT_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 111
40	PHT_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 130
86	PID_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 151
21	PLRN_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 118
68	PCR_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 113,132,142
46	PG_TABS	ENTRY,DECIMAL,FLOAT(SINGLE) 112,119,131
5	PRA_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 108,116,127

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
26		PRN_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 123,140,146
11		PST_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 102,109,117,122,128,135,138,145,150
16		PWN_TAB	ENTRY,DECIMAL,FLOAT(SINGLE) 110,129,139
2	**********	Q_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 33
2	**********	QUANT	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2		RA_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE 8
2		RECORD	STATIC,EXTERNAL,STRUCTURE,STRUCTURE
2	**********	RELOP	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	**********	RELOP	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 60
2	**********	RELOP	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	**********	RN_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 28
2	**********	RNAME	IN VAR_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	**********	RNAME	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	**********	RNAME	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 60
2	**********	RNAME	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
4		ROUTINE	(9)AUTOMATIC,INITIAL,LABEL 108,116,122,127,135,138,145,150,107
		SPRINT	FILE,EXTERNAL 104,114,120,125,133,136,143,148,152

DCL NO.	ICENTIFIER	ATTRIBUTES AND REFERENCES
2	********* ST_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 13,100,107
2	********* TCOMP	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	********* TCOMP	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 60
2	********* TCOMP	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	VAR_TAB	(10)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE
2	********* V#	IN VAR_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* V#	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* V#	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* WCOMP	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* WCOMP	IN FN_MT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 50
2	********* WCOMP	IN DTOV_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0) 60
2	********* WCOMP	IN DT_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* WCOMP	IN RA_TAB(10) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* WCOMP1	IN WP_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* WCOMP2	IN WP_TAB(5) IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED (15,0)
2	********* WN_TAB	IN RECORD,STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 18
2	WP_TAB	(5)IN RECORD,STATIC,EXTERNAL,STRUCTURE,STRUCTURE 65
4	********* WS_VAL	STATIC,EXTERNAL,ALIGNED,BINARY,FIXED(15,0) 100

SYNTAX CHECK CCMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
3	IDENTS	1310
2	RECORD	1652
4	RCUTINE	72

STORAGE REQUIREMENTS.

THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED INTERPR IS 292 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PRA_TAB IS 280 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PST_TAB IS 192 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PWN_TAB IS 192 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PLRN_TAB IS 192 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PRN_TAB IS 192 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PGT_TAB IS 244 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PHT_TAB IS 256 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PQ_TABS IS 580 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED POR_TAB IS 276 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PAL_TAB IS 216 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PAT_TAB IS 288 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PID_TAB IS 216 BYTES LONG.
THE STORAGE AREA (IN STATIC) FOR THE PROCEDURE LABELLED PAS_TAB IS 292 BYTES LONG.
THE PROGRAM CSECT IS NAMED INTERPR AND IS 11942 BYTES LONG.
THE STATIC CSECT IS NAMED INTERPRA AND IS 5764 BYTES LONG.

STATISTICS SOURCE RECORDS = 318,PROG TEXT STMNTS = 153,OBJECT BYTES = 11942

COMPILER DIAGNOSTICS.

WARNINGS.

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS.
SCARDS/SPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM0526I 1 OPTION MAIN HAS NOT BEEN SPECIFIED FOR THE EXTERNAL PROCEDURE, STATEMENT
NUMBER 1

IEM0764I ONE OR MORE FIXED BINARY ITEMS OF PRECISION 15 OR LESS HAVE BEEN GIVEN
HALFWORD STORAGE. THEY ARE FLAGGED '**********' IN THE XREF/ATR LIST.

END OF DIAGNOSTICS.

COMPILE TIME 20.38 SECS

ELAPSED TIME 9.32 MINS

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IIIIIII     NNNN     NNN  TTTTTTTTTTT   EEEEEEEEEE   RRRRRRRR     PPPPPPPPP    RRRRRRRR
IIIIIII     NNNNN    NNN  TTTTTTTTTTT   EEEEEEEEEE   RRRRRRRRR    PPPPPPPPPP   RRRRRRRRR
  III       NNNNNN   NNN      TTT       EEE          RRR   RRR    PPP     PPP  RRR    RRR
  III       NNN NNN  NNN      TTT       EEEEEE       RRRRRRRRR    PPPPPPPPPP   RRRRRRRRR
  III       NNN  NNNNNN      TTT       EEE          RRRRRRRR     PPPPPPPPP    RRRRRRRR
  III       NNN NNN NNN      TTT       EEEEEE       RRRRRRRRR    PPPPPPPPPP   RRRRRRRRR
  III       NNN  NNNNNN      TTT       EEE          RRRRRRRR     PPPPPPPPP    RRRRRRRR
IIIIIII     NNN   NNNNN      TTT       EEEEEEEEEE   RRR   RRR    PPP          RRR    RRR
IIIIIII     NNN    NNNN      TTT       EEEEEEEEEE   RRR    RRR   PPP          RRR     RRR
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