KWIC- Keyword In Context Indexing Information Retrieval for 1620

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KWIC - Keyword In Context Indexing
Information Retrieval for 1620

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DECK KEY

Three decks are included:

1. SPS source deck 225 cards
   Sequence numbered in columns 1-4

2. KWIC object deck 55 cards
   Sequence numbered in columns 76-80

3. Sample data 24 cards
   Sequence numbered in columns 79-80

Modifications or revisions to this program, as they occur, will be announced in the appropriate Catalog of Programs for IBM Data Processing Systems. When such an announcement occurs, users should order a complete new program from the Program Information Department.

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PROGRAM BRIEF

This program provides a method of indexing any set of titles. Each word indexed appears in the context of the title.

Titles may contain up to 600 characters plus a twelve character label. Up to 650 words may be specified which are not to be indexed. The program indexes each word in every title except for these words and words shorter than 3 characters. Any number of titles may be indexed.

One card is punched for each word indexed. Up to 60 characters of the title plus the 12 word label appear on each card. The output must be sorted alphabetically and 80-80 listed off line.

KWIC is SPS - coded for any card 1620. 20K of memory is used.

Output is produced at punch speed (125 cpm). The sample problem runs in about one minute. This program has been used to index several personal libraries.

This program and its documentation were written by two IBM employees. It was developed for a specific purpose and submitted for general distribution to interested parties in the hope that it might prove helpful to other members of the data processing community. The program and its documentation are essentially in the author's original form. IBM serves only as the distribution agency in supplying this program. Questions concerning the use of the program should be directed to the author's attention .

DETAILED PROGRAM DESCRIPTION

Part of the following section is taken from G.I. Manual E20-8091.

"The simplest form of a quickly assembled index is an alphabetic listing of significant words from some store of information -- for example, the type of index generally found at the back of a textbook. The simplicity of such an index is due to the fact that the reader is assumed to be familiar with the subject matter of the book. In dealing with documents on many subjects, however, the significance of individual words can be determined only by referring to the statement from which the word was taken."

"This time-consuming reference can be avoided by listing the selected words (called keywords) together with the words surrounding them -- that is, listing the keywords in context -- because this reveals the specific sense in which the keyword has been used."

"KWIC indexing can be adapted to the literature of any scientific discipline, as well as to such areas as correspondence files, files of internally generated memorandums, legal papers, procedure manuals, etc."

"For a computer to select keywords when programmed for KWIC indexing, a word list must be stored in it to enable it to differentiate between significant words (that is, keywords) and nonsignificant words. To establish such a word list, keywords need only be defined as those which characterize a subject more than others. Since significance is difficult to predict, it is more practical simply to reject all obviously nonsignificant words, such as articles, conjunctions, prepositions, auxiliary verbs, certain adjectives, and words such as "report", "analysis" and "theory." In addition, words such as "chemical" in a listing of chemical titles, or "law" in a listing of legal titles, would be nonsignificant. When establishing a word list in this manner, there is a risk of admitting words of questionable significance. These may either be caught later through statistical analysis of frequency, or simply be tolerated. It is the task of the personnel in control of this word list to continually adjust it as required by the nature of the material being indexed and as dictated by user reaction.

"The first step in setting up a KWIC indexing system is to prepare the list of nonsignificant words. This list is recorded and maintained on punched cards and forms part of the input to the computer.

Creation of a title/location record for each document to be indexed is the next step. This information concerning each document is punched on up to 10 IBM cards.

This KWIC program makes maximum use of available space by a technique called "wrap-around". This term refers to the fact that some or all of the title may precede or follow -- that is, wrap around -- the keyword.

This kwic program differs in two important respects from other such programs.

1. Minimum input requirements.

   Only titles plus location of documents are required. No other coding need be present.

2. Free form input.

   For readability, blanks may be included anywhere in the title field except in the middle of words. The program will eliminate excess blanks.

INPUT DESCRIPTION

The input deck consists of two parts: words not to be indexed and title cards. Letters A-Z, numbers 0-9, and the hyphen (-) are considered parts of words. Any other punches are considered punctuation.

Words Not To Be Indexed. These words are punched one to a card left justified in the first ten columns. The following 70 columns are ignored. Words longer than 10 characters are truncated to 10 characters.

If a word or the first part of a word in this list is the same as a word in a title, that word is not indexed. If the word in the title is longer than 10 letters, only the first ten are considered in this comparison.

Some examples should clarify this.

Words in list not to be indexed	Words in title which will not be indexed	Words in title which will be indexed
COMPUTATION	COMPUTATIONS COMPUTATION	COMPUTER
FORECASTS	FORECASTS FORECAST FORE FOR	FORECASTING FOREWARNS
ADDRESS	ADDRESS ADD	ADDRESSES

Title Cards

The title may be punched anywhere in the first 60 columns of a title card. Up to ten cards may be used for one title. Column 1 of a continuing title card is assumed to follow immediately after column 60 of the preceding card. Superfluous blanks are removed from the title by the program. Columns 61-72 of the first card of a title must contain a label identifying the title. If the title is longer than one card, this description field on succeeding cards may either be left blank or may be an exact duplication of the label of the first card of the title.

SUMMARY

WORDS NOT TO BE INDEXED

Columns 1-10	Word left justified in field
11-80	Ignored

TITLE CARDS

Columns 1-60	Title Anywhere in field
61-72	Label
73-80	Ignored

Input Deck

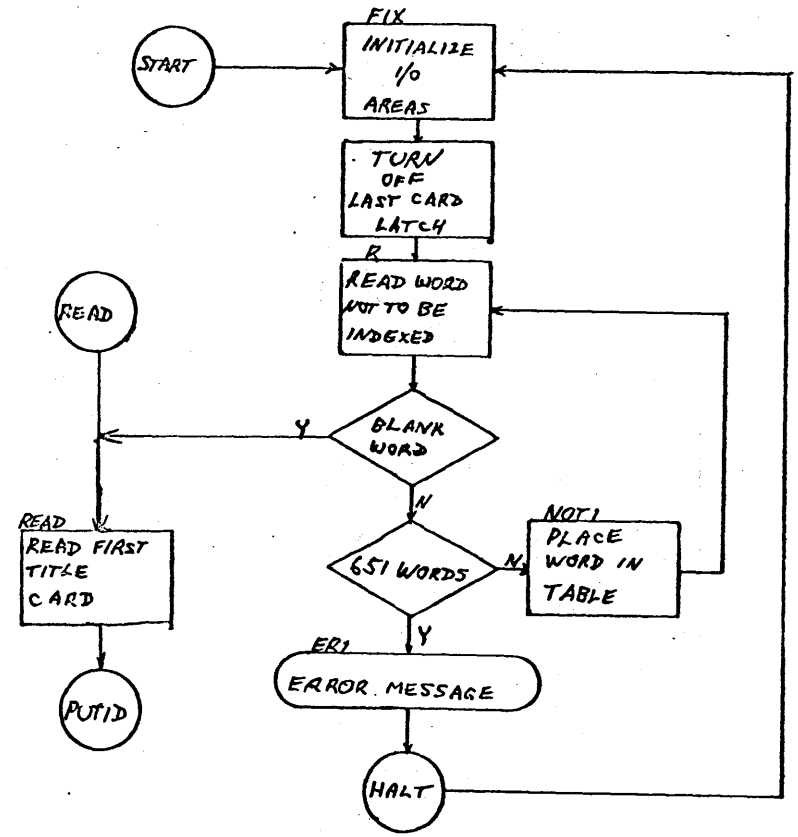
1. Words not to be indexed (at least one)
2. Blank card
3. Title cards (any number of titles)

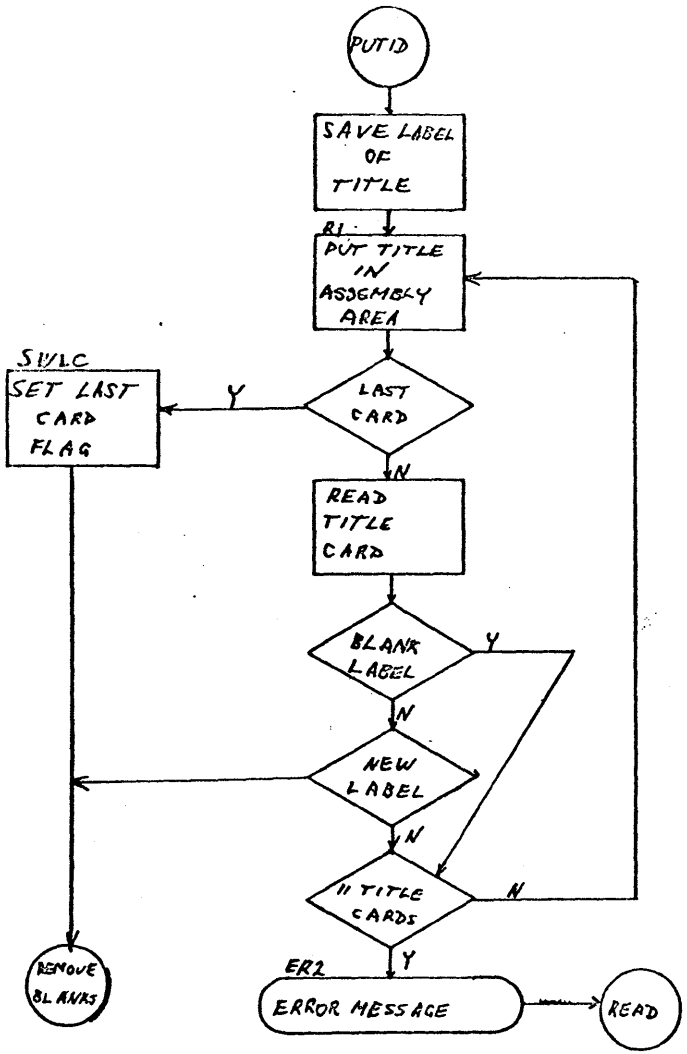
OUTPUT FORMAT

The output format looks very similar to the input title card. The end of each title line is marked by an asterisk (*). The keyword being indexed is punched beginning in column 21, with as much of the title as possible, wrapped around when necessary, around it from column 1 through column 60. Columns 61-62 are blank, the title location is punched in columns 63-74. Columns 75-80 are blank.

An alphabetical sort of columns 25, 24, 23, 22, 21, in that order, will usually serve to establish a sufficient order for listing and subsequent retrieval.

KWIC
BLOCK DIAGRAM




PUTID
SAVE LABEL OF TITLE
R1
PUT TITLE IN ASSEMBLY AREA
SWLC
SET LAST CARD FLAG
LAST CARD
Y
N
READ TITLE CARD
BLANK LABEL
Y
N
NEW LABEL
N
11 TITLE CARDS
N
Y
ER2
ERROR MESSAGE
READ
REMOVE BLANKS

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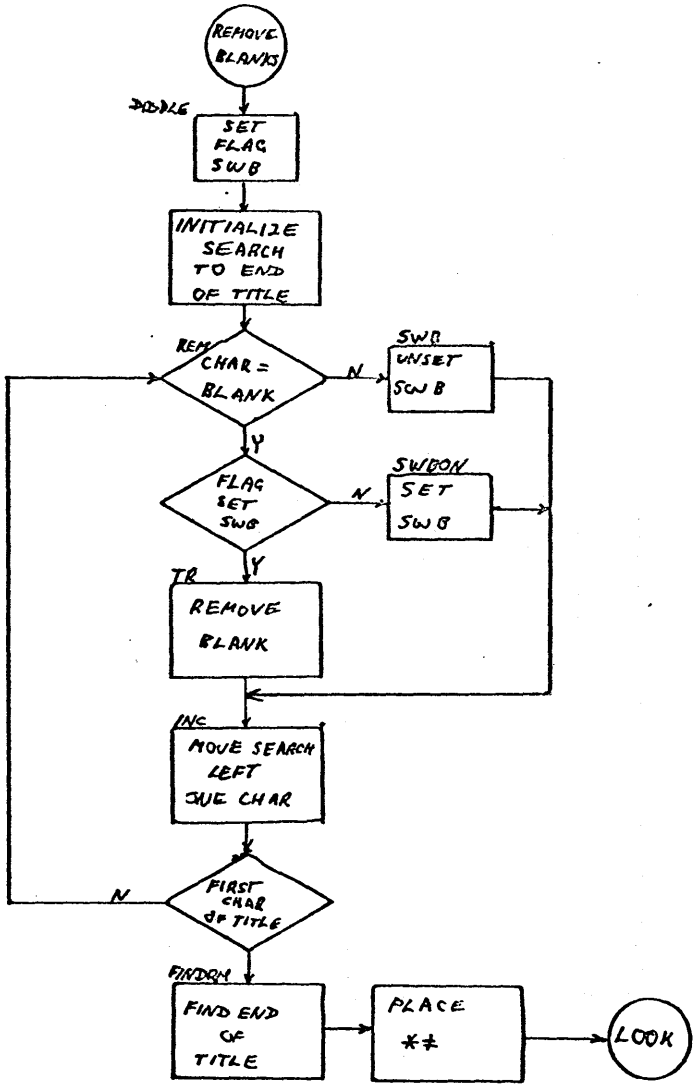
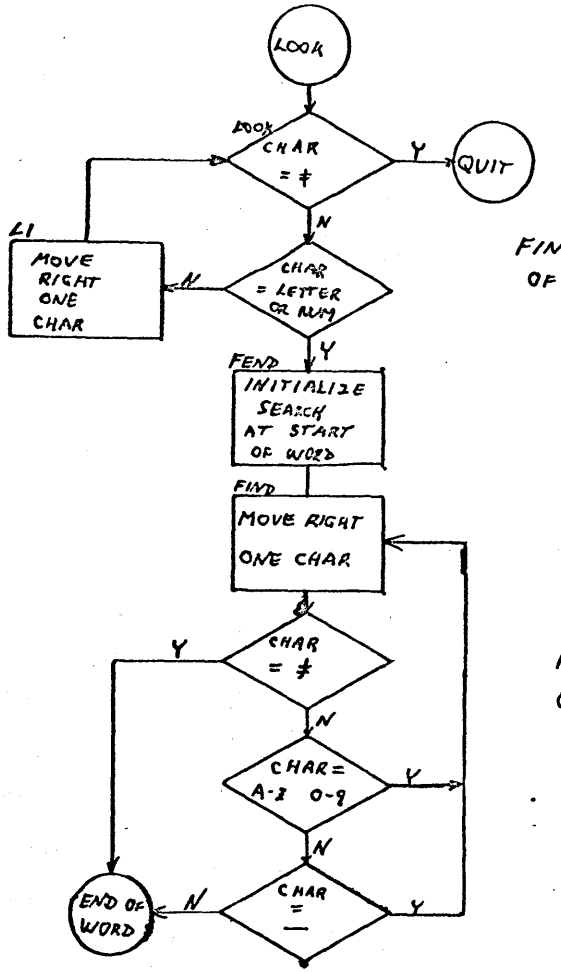

REMOVE BLANKS
SET FLAG SWB
INITIALIZE SEARCH TO END OF TITLE
REM
CHAR = BLANK
N
SWB
UNSET SWB
Y
FLAG SET SWB
N
SWBON
SET SWB
Y
TR
REMOVE BLANK
INC
MOVE SEARCH LEFT ONE CHAR
FIRST CHAR OF TITLE
N
FINDRM
FIND END OF TITLE
PLACE **
LOOK

11



FIND START OF WORD

FIND END OF WORD

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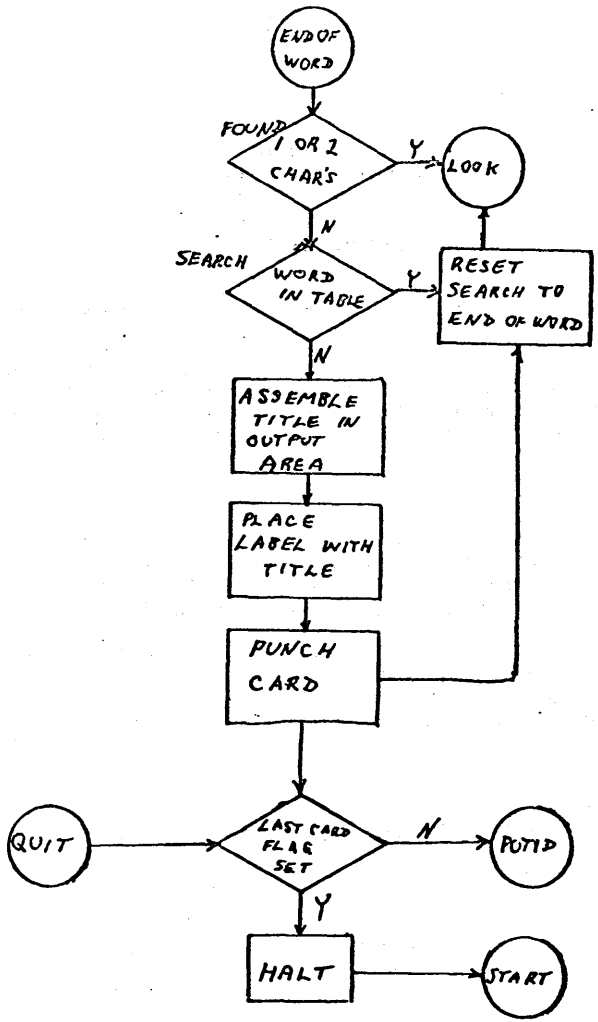

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Detailed Coding Information

This program was assembled using SPS-1620/1710 for cards, 1620-SP-020, Version 2, Mod 12. Standard SPS coding was used throughout.

Clearing memory before program loading is a necessity, otherwise the flags in the input area will not be initialized properly. The "last card" switch (09) is used for test for end of job. If this point is reached prematurely due to running the cards out with more to follow, restart from the beginning with all cards except those already indexed.

Storage Map

00000-00399	arithmetic tables
00402-02641	program
02642-18460	constants, work area
18461-10999	not used

Operating Procedures

Sense switches are not used. Set all other switches to stop.

1. Clear memory (not optional)
2. Load KWIC indexing object program. (deck 2)
3. Place input deck in read hopper. Press reader start.
4. Ready the punch.
5. Press start key on 1620 console.
6. When all titles have been indexed the program halts (48 in op code register)
7. Pressing the start key on the 1620 console reinitializes and restarts the program.

Error Messages

"MORE THAN 650 WORDS NOT TO BE INDEXED." After this message is typed the program halts. Pressing the start key reinitializes and restarts the program. The error is probably due to forgetting the blank card between the two parts of the input deck.

"MORE THAN 10 TITLE CARDS". Program halts after this message is typed. Pressing start restarts the program to read a new title. This error may be due to the presence of blank cards among the title cards or forgetting to punch a label in the first card of a title.

Note : This program requires that memory be cleared before loading, as the input and output areas are not cleared by the program. Failure to observe this restriction will probably result in a hung program or spurious output.

Note: to clear memory - "instant stop"
"reset"
"insert"
type 160001000000
"release"
"start"
after about 3 seconds,
"instant stop"

Kwic Assembly listing 1/4

```
                        *          KWIC INDEXING PROGRAM FOR IBM 1620
00402 32 02646 00000    FIX     SF    INNOT+1,,,   INITIALIZE INPUT AREA
00414 16 00432 -2808            TFM   *+18,IN+1
00426 32 02808 00000            SF    IN+1
00438 11 00432 -0002            AM    *-6,2
00450 14 00432 -2928            CM    *-18,IN+121
00462 47 00426 01100            BNH   *-36
00474 16 00521 00051            TFM   NUMNOT,651,9
00486 16 00600 -2993            TFM   NOT1+6,NOT+1
00498 46 00510 00900            BLC   *+12
00510 33 01040 00000            CF    SWLC
00521    00000          NUMNOT  DS
00522 32 02647 00500    R       RACD  INNOT+2
00534 14 02647 000-0            CM    INNOT+2,,10
00546 46 00840 01200            BE    READ
00558 12 00521 000-1            SM    NUMNOT,1,10
00570 46 00626 01200            BZ    ER1
00582 25 02667 15995            TD    INNOT+22,RM
00594 31 02993 02646    NOT1    TR    NOT+1,INNOT+1
00606 11 00600 -0020            AM    NOT1+6,20
00618 49 00522 00000            B     R
00626                           DORG  *-3
00626 34 00000 00102    ER1     RCTY
00638 39 00671 00100            WATY  E1
00650 48 00000 00000            H
00662 49 00402 00000            B     FIX
0067                            DORG  *-3
00671    00038          E1      DAC   38,MORE THAN 650 WORDS NOT TO BE INDEXED-
00746 34 00000 00102    ER2     RCTY
00758 39 00791 00100            WATY  E2
00770 48 00000 00000            H
00782 49 00840 00000            B     READ
00789                           DORG  *-4
00791    00025          E2      DAC   25,MORE THAN 10 TITLE CARDS-
00840 32 02809 00500    READ    RACD  IN+2
00852 22 02805 02805            S     INNOT+160,INNOT+160
00864 26 02991 02951    PUTID   TF    OUTL,INL
00876 16 00918 J5998            TFM   R1+18,ASM+1
00888 16 00947 000J0            TFM   NC,10,10
00900 25 02929 15995    R1      TD    IN+122,RM
00912 31 15998 02808            TR    ASM+1,IN+1     ,,READ TITLE CARDS
00924 46 01040 00900            BLC   SWLC
00936 32 02809 00500            RACD  IN+2
00947    00000          NC      DS
00948 14 02951 -0000            CM    INL
00960 46 00996 01200            BE    NCT
00972 24 02951 02991            C     INL,OUTL
00984 47 01052 01200            BNE   DIDDLE
00996 12 00947 000-1    NCT     SM    NC,1,10
01008 46 00746 01200            BZ    ER2
01020 11 00918 -0120            AM    R1+18,120
01032 49 00900 00000            B     R1
0104                            DORG  *-3
01040 32 01040 00000    SWLC    SF    *
01052 11 00918 -0119    DIDDLE  AM    R1+18,119
01064 32 01212 00000            SF    SWB
01076 26 01094 00918            TF    REM+6,R1+18
```

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```
01088 14 00000 000-0    REM     CM    ,,10,      REMOVE BLANKS
01100 47 01212 01200            BNE   SWB
01112 44 01192 01212            BNF   SWBON,SWB
01124 26 01183 01094            TF    TR+11,REM+6
01136 11 01183 -0001            AM    TR+11,1
01148 26 01178 01094            TF    TR+6,REM+6
01160 12 01178 -0001            SM    TR+6,1
01172 31 00000 00000    TR      TR
01184 49 01224 00000            B     INC
01192                           DORG  *-3
01192 32 01212 00000    SWBON   SF    SWB
01204 49 01224 00000            B     INC
01212                           DORG  *-3
01212 33 01212 00000    SWB     CF    SWB
01224 12 01094 -0002    INC     SM    REM+6,2
01236 14 01094 J5997            CM    REM+6,ASM
01248 47 01088 01200            BNE   REM
01260 16 01295 J5997            TFM   FINDRM+23,ASM
01272 11 01295 -0002    FINDRM  AM    *+23,2
01284 45 01272 15997            BNR   FINDRM,ASM
01296 26 01314 01295            TF    *+18,*-1
01308 16 00000 000J4            TFM   ,14,10
01320 11 01314 -0002            AM    *-6,2
01332 26 01350 01314            TF    *+18,*-18
01344 16 00000 000-0            TFM   ,,10
01356 11 01350 -0002            AM    *-6,2
01368 26 01386 01350            TF    *+18,*-18
01380 25 00000 15995            TD    ,RM
01386    00000          END     DS    ,*-5
00413    00000          NUM     DS    ,FIX+11
01392 16 01415 J5999            TFM   NOW,ASM+2
01404 45 01424 00000    LOOK    BNR   *+20,,,      FIND START OF NEXT WORD
01415    00000          NOW     DS
01416 49 02612 00000            B     QUIT
01424                           DORG  *-3
01424 26 01442 01415            TF    *+18,NOW
01436 14 00000 000M0            CM    ,40,10
01448 46 01480 01100            BH    FEND
01460 11 01415 -0002    L1      AM    NOW,2
01472 49 01404 00000            B     LOOK
0148                            DORG  *-3
01480 26 01515 01415    FEND    TF    LAST,NOW
01492 11 01515 -0002    FIND    AM    LAST,2      ,,FIND END OF WORD
01504 45 01524 00000            BNR   *+20
01515    00000          LAST    DS
01516 49 01596 00000            B     FOUND
01524                           DORG  *-3
01524 26 01542 01515            TF    *+18,LAST
01536 14 00000 000M0            CM    ,40,10
01548 46 01492 01100            BH    FIND
01560 26 01578 01515            TF    *+18,LAST
01572 14 00000 000K0            CM    ,20,10
01584 46 01492 01200            BE    FIND
01596 12 01515 -0003    FOUND   SM    LAST,3
01608 12 01415 -0001            SM    NOW,1
01620 24 01415 01515            C     NOW,LAST
01632 47 01664 01200            BNE   L2
01644 11 01415 -0001    L3      AM    NOW,1
```

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```
01656 49 01460 00000          B     L1
01664                         DORG  *-3
01664 26 01694 01415   L2     TF    RF+18,NOW
01676 11 01694 -0002   RF     AM    *+18,2
01688 33 00000 00000          CF
01700 24 01694 01515          C     *-6,LAST
01712 47 01676 01200          BNE   RF
01724 26 00413 01515          TF    NUM,LAST
01736 22 00413 01415          S     NUM,NOW
01748 14 00413 -0002          CM    NUM,2
01760 47 01644 01100          BNH   L3
01772 14 00413 -0018          CM    NUM,18
01784 47 01808 01100          BNH   *+24
01796 16 00413 -0018          TFM   NUM,18
01808 16 01891 -2994          TFM   A,NOT+2
01820 16 01906 -2994          TFM   B,NOT+2
01832 26 01911 01415          TF    C,NOW
01844 21 01906 00413          A     B,NUM
01856 21 01911 00413          A     C,NUM
01868 11 01911 -0001          AM    C,1
01880 45 01900 00000   SEARCH BNR   *+20,,,      IS WORD IN NOT TABLE
01891    00000         A      DS
01892 49 01976 00000          B     WRITE
0190                          DORG  *-3
01900 24 00000 00000          C
01906    00000         B      DS    ,*-5
01911    00000         C      DS    ,*
01912 46 01956 01200          BE    GOBK
01924 11 01891 -0020          AM    A,20
01936 11 01906 -0020          AM    B,20
01948 49 01880 00000          B     SEARCH
01956                         DORG  *-3
01956 26 01415 01515   GOBK   TF    NOW,LAST
01968 49 01644 00000          B     L3
01976                         DORG  *-3
01976 26 17369 02805   WRITE  TF    OUT+160,INNOT+160   ,, WRITE TITLE CARD
01988 26 00413 01415          TF    NUM,NOW
02000 12 00413 J6038          SM    NUM,ASM+41
02012 46 02364 01100          BP    CB
02024 33 00413 00000          CF    NUM
02036 26 01891 00413          TF    A,NUM
02048 11 01891 J7210          AM    A,OUT+1
02060 26 02078 01891          TF    *+18,A
02072 31 00000 15998          TR    ,ASM+1
02084 26 01906 01386          TF    B,END
02096 12 01906 J5998          SM    B,ASM+1
02108 21 01906 01891          A     B,A
02120 26 02138 01906          TF    *+18,B
02132 16 00000 000-0          TFM   ,,10
02144 11 01415 -0079          AM    NOW,79
02156 12 01891 -0001          SM    A,1
02168 26 01906 01386          TF    B,END
02180 12 01906 -0002          SM    B,2
02192 14 01891 J7209   CA     CM    A,OUT
02204 46 02308 01200          BE    PUNCH
02216 24 01906 01415          C     B,NOW
02228 47 02308 01100          BNH   PUNCH
02240 26 02270 01891          TF    *+30,A
```



```
02252 26 02275 01906          TF    *+23,B
02264 25 00000 00000          TD
02276 12 01906 -0001          SM    B,1
02288 12 01891 -0001          SM    A,1
02300 49 02192 00000          B     CA
02308                         DORG  *-3
02308 26 17357 02991   PUNCH  TF    OUT+148,OUTL
02320 26 17369 02657          TF    OUT+160,INNOT+12
02332 16 17333 0-000          TFM   OUT+124,,8
02344 39 17211 00400          WACD  OUT+2
02356 49 01956 00000          B     GOBK
02364                         DORG  *-3
02364 26 00413 01415   CB     TF    NUM,NOW
02376 12 00413 -0040          SM    NUM,40
02388 26 02411 00413          TF    *+23,NUM
02400 31 17210 00000          TR    OUT+1
02412 26 01891 01386          TF    A,END
02424 22 01891 00413          S     A,NUM
02436 11 01891 J7210          AM    A,OUT+1
02448 26 02466 01891          TF    *+18,A
02460 16 00000 000-0          TFM   ,,10
02472 11 01891 -0001          AM    A,1
02484 16 01906 J5998          TFM   B,ASM+1
02496 24 01906 00413   CB1    C     B,NUM
02508 46 02308 01200          BE    PUNCH
02520 14 01891 J7329          CM    A,OUT+120
02532 46 02308 01100          BH    PUNCH
02544 26 02574 01891          TF    *+30,A
02556 26 02579 01906          TF    *+23,B
02568 25 00000 00000          TD
02580 11 01891 -0001          AM    A,1
02592 11 01906 -0001          AM    B,1
02604 49 02496 00000          B     CB1
02612                         DORG  *-3
02612 44 00864 01040   QUIT   BNF   PUTID,SWLC
02624 48 00000 00000          H
02636 49 00402 00000          B     FIX
02643                         DORG  *-4
02645    00001         INNOT  DAS   1
02805    00160                DS    160
02807    00001         IN     DAS   1
02967    00160                DS    160
02951    00000         INL    DS    ,IN+144
02991    00024         OUTL   DS    24
02992    00001         NOT    DS    1
15994    13002                DS    13002
15995    00001         RM     DC    1,-
15997    00001         ASM    DAS   1
17207    01210                DS    1210
17209    00001         OUT    DAS   1
18459    01250                DS    1250
00402                         DEND  FIX
```

KWIC Object Deck listing 1/1

```
3600072005003600201005004400012002762600059002742500011000002600090002690000000
2600095002643100000002002600114002742500000000114900012044055920333149059Z200001
3202646000001600432028083202808000001100432000021400432029282001004020046200002
4700426011001600521000511600600029934600510009003301040000002001004620052200003
3702647005001402647000004600840012001200521000014600626012002001005220058200004
2502667159953102993026461100600000204900522000002                0010058200630 00005
3400000001023900671001004800000000004900402000002                0010062600674 00006
N4565945006348415500767570006656594462005556630063Z             1010067000720 00007
5600424500495544456745440Z                                       1010072000746 00008
3400000001023900791001004800000000004900840000002               0010074600794 00009
N4565945006348415500717000634963534500434159446202              1010079000840 00010
3702809005002202805028052602991029511600918J59981600947000J0Z0010084000900 00011
2502929159953115998028084601040009003702809005001402951000002001009000096O 00012
4600996012002402951029914701052012001200947000014600746012002001009600102O 00013
1100918001204900900000002                                        -10102001044 00014
3201040000001100918001193201212000002601094009181400000000002001010400110O 00015
4701212012004401192012122601183010941101183000012601178010942001011000116O 00016
1201178000013100000000004901224000002                           0010116001196 00017
3201212000004901224000002                                       -10119201216 00018
3301212000001201094000021401094J59974701088012001601295J5997Z001012120127Z 00019
1101295000024501272159972601314012951600000000J41101314000002Z001012720133Z 00020
2601350013141600000000001101350000022601386013502500000159952001013320139Z 00021
1601415J59994501424000004902612000002                           0010139201428 00022
2601442014151400000000M0460148001100110141500002490140400000Z001014240148O 00023
2601515014151101515000024501524000004901596000002               0010148001528 00024
2601542015151400000000M0460149201100260157801515140000000K0Z001015240158O 00025
4601492012001201515000031201415000012401415015154701664012002001015840164O 00026
1101415000014901460000002                                       -10164401668 00027
2601694014151101694000023300000000002401694015154701676012002001016640172O 00028
2600413015152200413014151400413000024701644011001400413000182001017240178O 00029
4701808011001600413000181601891029941601906029942601911014152001017840184O 00030
2101906004132101911004131101911000014501900000004901976000002001018440190O 00031
2400000000004601956012001101891000201101906000204901880000002001019000196O 00032
2601415015154901644000002                                       -10195601980 00033
2617369028052600413014151200413J6038460236401100330041300000Z001019760203O 00034
2601891004131101891J7210260207801891310000015998260190601386Z001020360209O 00035
1201906J59982101906018912602138019061600000000001101415000797001020960215O 00036
1201891000012601906013861201906000021401891J7209460230801200Z001021560221O 00037
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Sample Output data

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STUDY                                                                    DATA  01
AND                                                                      DATA  02
THE                                                                      DATA  03
ABOUT                                                                    DATA  04
SEVEN                                                                    DATA  05
USE                                                                      DATA  06
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