Department of Applied Analysis
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THE DIALATOR SYSTEM
FILE SYSTEM USER'S GUIDE

by

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We wish to thank the Defence Research Board of Canada, the Northern Electric Research and Development Laboratories, Ottawa, and the Faculty of Mathematics of the University of Waterloo for financial, technical and moral support which made this system of programs possible.

Other manuals in this series are:

1. TRAIZE User's Guide
2. FAUST User's Guide
3. General Programmer's Guide
4. TRAIZE Programmer's Guide
5. FAUST Programmer's Guide
6. File System Programmer's Guide

FILE SYSTEM USER'S GUIDE

This is a user's guide to the programs of the DIALATOR file system. (A system programmer's guide, explaining internal workings of the file system, appears later). This guide is laid out as follows:

SECTION 1. List Structures

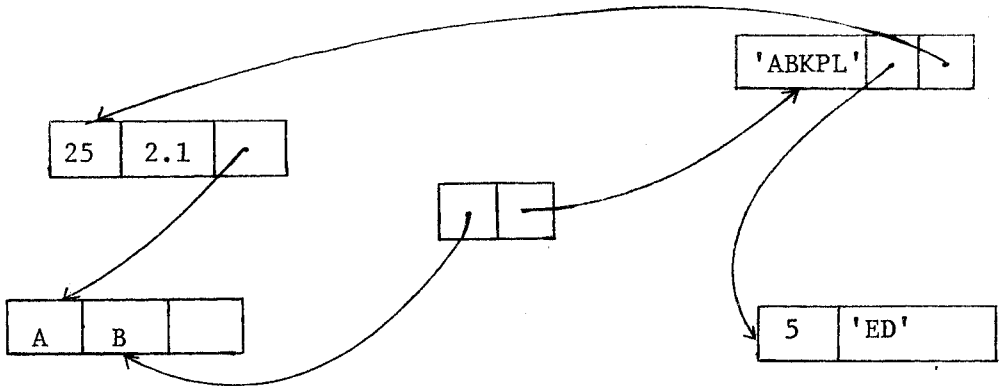
SECTION 2. Trees

SECTION 3. The DIALATOR file directory

SECTION 4. Maintenance of the DIALATOR file.

SECTION 1. List Structures

A list structure is a set of objects called nodes. On paper such a structure might look as follows:



Each disjoint rectangle is a single node. Notice that the rectangles have subdivisions. These subdivisions are called fields and each field contains a single data item, e.g. a character string or number.

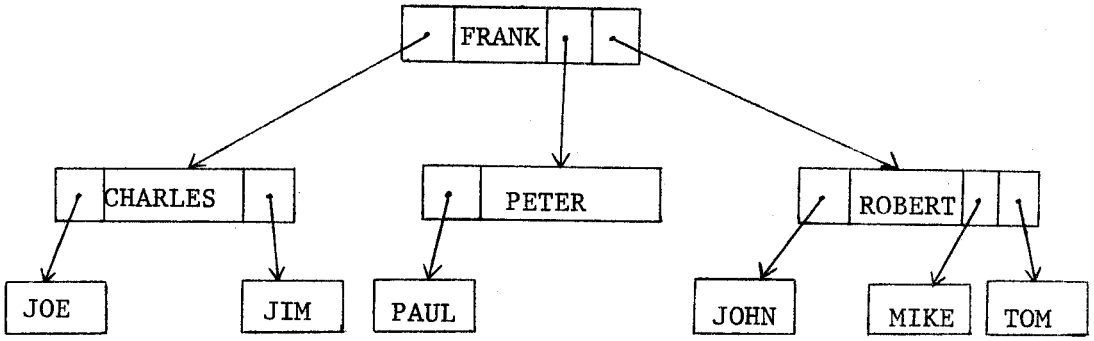
A node is implemented as a single block of core, so that, if we have the address of the node, we can access each of its fields.

The nodes in the above diagram are connected by arrows. These arrows are called pointers and they link together the nodes of the list structure. In actual fact these pointers are the addresses of the nodes to which they point.

It is necessary, also, to have a head node, or some other means of accessing the structure as a whole.

SECTION 2. Trees

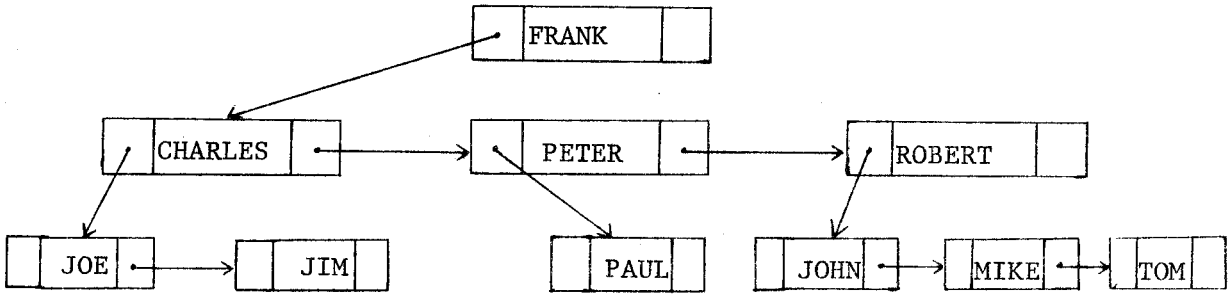
A special type of list structure is called a tree. Here is an example of a situation in which a tree structure is useful.



This is a father-son family tree. Frank's sons are, Charles, Peter, and Robert. Their sons are, Joe, and Jim; Paul; and, John, Mike, and Tom, respectively. Ambiguity builds, in the English expression, as the family grows, but not so with the tree.

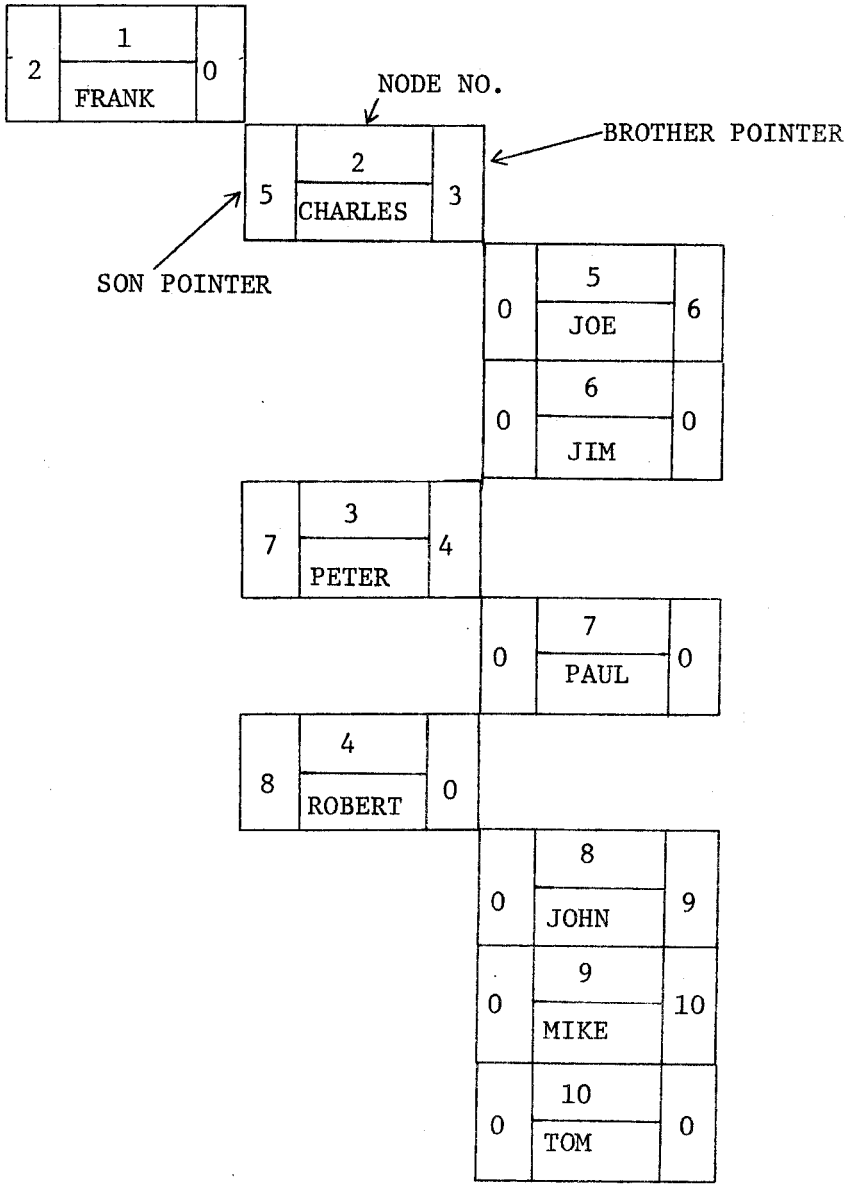
The above example can be expressed as a binary tree. In fact, any tree can be expressed as a binary tree.

It would look as follows:



Now we have exactly two pointers per node, and, we designate the left pointer as the 'son' pointer, and the right pointer as the 'brother' pointer.*

Here is a picture of how a computer might print out the above tree.



* Analogously we may refer to daughter and sister pointers.

SECTION 3. The DIALATOR file directory.

The DIALATOR file directory is a binary tree as described in SECTION 2). Each node contains the following:

```
* * * * * * * * * * *
* A       B       C *
* D   E   F   G   H *
* * * * * * * * * * *
```

The fields are:

A is the node number.

B is the node name.

C is the size of the structure pointed to by the node.

D is the starting byte number of the structure pointed to.

E is the starting region * number of the structure pointed to.

F is the type of structure pointed to.

G is the sister node pointed to.

H is the daughter node pointed to.

If D, E, G or H are false, the number minus one is inserted.

There are three types of nodes.

The 'FREE' nodes are those nodes which at some time were part of the tree and have been freed because of a deletion.

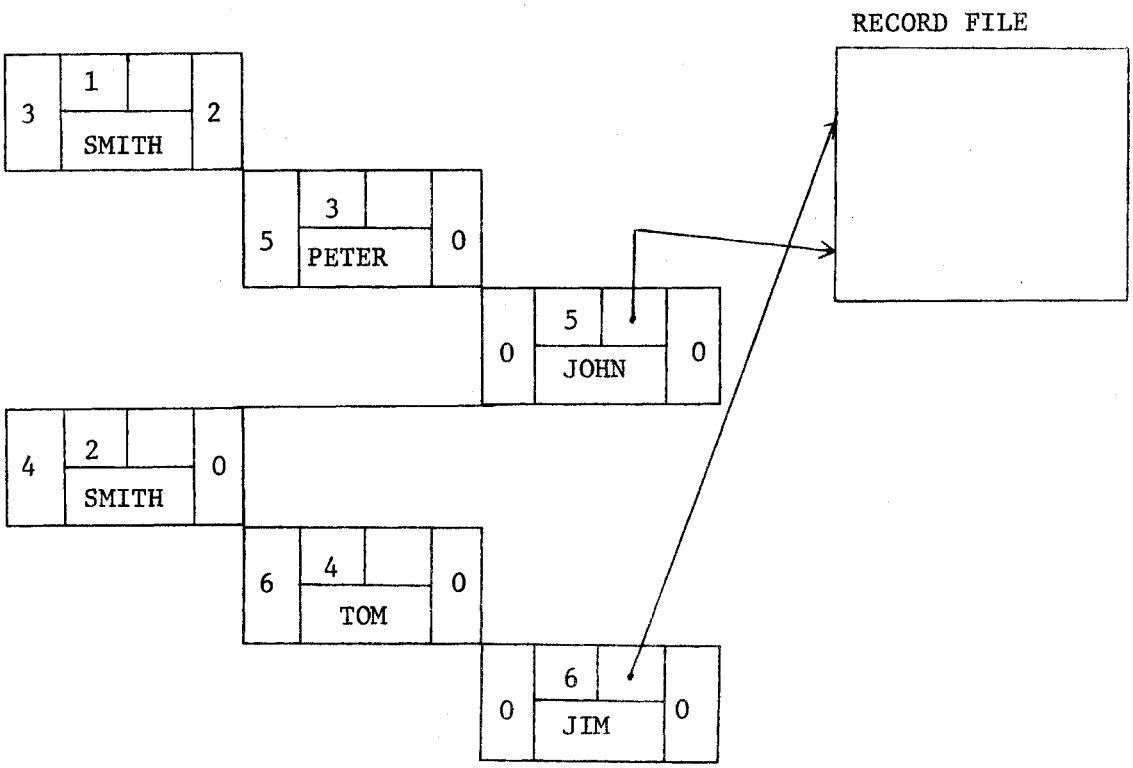
---

* In the system 360, core is divided into regions each of which has so many bytes.

The nonterminal nodes (TYP=0) are nodes which form part of the 'qualified' (explained later) name which distinguishes like structures belonging to different file entries.

The terminal nodes (TYP≠0) are nodes which point to a record in the record file. This record contains the structure indicated by the node name.

NOTE: The file directory is disjoint from the record file and pointers from one node to another in the tree should not be confused with pointers to regions of the record file. Pictorially we have:



This is a cross section of a file directory consisting of an alphabetically arranged list of names, last name first. The last given name points to the proper file in the record file.

The above example, also, clarifies 'qualified' names. When looking for Peter John Smith it is not good enough to look for Smith. This would be ambiguous.

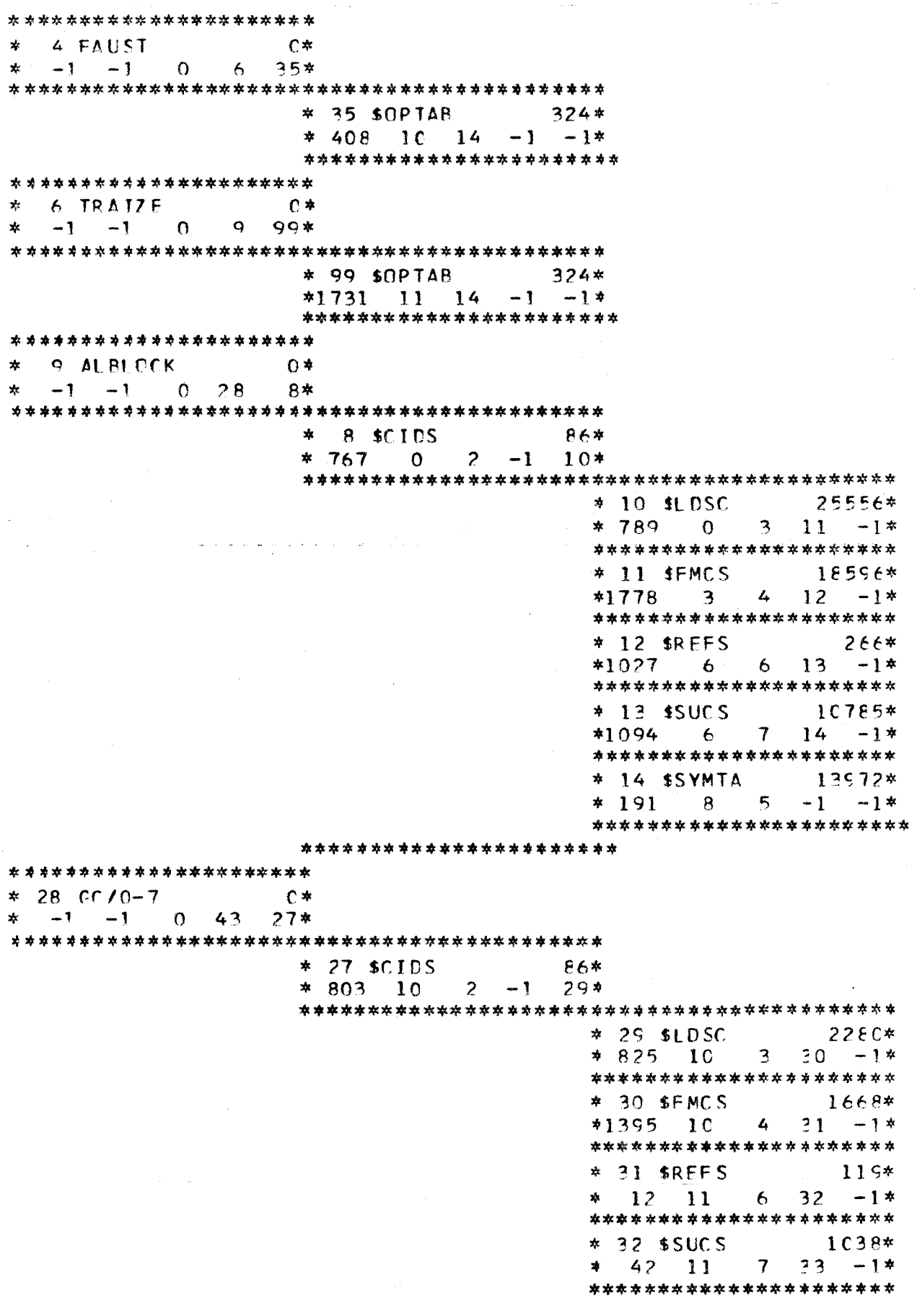
So too, in the DIALATOR system there are structures like $OPTAB and $LVBS which must be qualified or they will be ambiguous names. $OPTAB could mean TRAIZE. $OPTAB or FAUST.$OPTAB. The use of the period, here, is similar to its use in qualified names of the PL/1 language. The rules are also the same. As many qualifiers may be tacked on as needed. In this format we would refer to Smith, Peter, John as Smith.Peter.John.

Here is a view of the DIALATOR file.

```
===== DIRECTORY LISTING =====

    117 AVAIL POINTER.
     40 REGIONS USED .
     24 STRUCTURES RECOGNIZED.
    185 NODES IN THE DIRECTORY.
    185 DESIRED NO. OF NODES.
     22 KEY-WORDS RECOGNIZED.
700811 DATE OF LAST CHANGE.


===== DIALATOR KEY-WORDS TABLE =====

NO    KEY-WORD   INDEX
   1                 0
   2                 0
   3                 0
   4                 0
   5                 0
   6                 0
   7                 0
   8                 0
   9   $CTFS         2
  10   $COPT         1
  11   $CTRES       10
  12   $DIATR       11
  13   $FMCS         4
  14   $LDSC         3
  15   $LVRS        13
  16   $OPTAB       14
  17   $REFS         6
  18   $SFMC         9
  19   $SUCS         7
  20   $SYMTA        5
  21   $TFCS        12
  22   $TERM         8

===== THE DIRECTORY TREE =====

**********************
*NO  REC NAME     SIZ*
*  STR SRG TYP STS DAU*
**********************
*   0 REC_FILE       0*
*   -1  -1    0    4   1*
**********************************************
                      *   1 HEADFREE       0*
                      *   -1  -1    0  97  -1*
                      **********************
                      *  97 ..FREE..       37*
                      *1044   12    0  86  -1*
                      **********************
                      *  86 ..FREE..       74*
                      *  699  12    0  71  -1*
                      **********************
```

```
* 71 ..FREE..          11*
* 544  12   0  98  -1*
**********************
* 98 ..FREE..           8*
* 481  12   0  83  -1*
**********************
* 83 ..FREE..          75*
*  20   0   0  82  -1*
**********************
* 82 ..FREE..          56*
* 589  12   0  81  -1*
**********************
* 81 ..FREE..         124*
* 492  12   0  78  -1*
**********************
* 78 ..FREE..         168*
* 547  12   0  51  -1*
**********************
* 51 ..FREE..          21*
* 674  11   0  84  -1*
**********************
* 84 ..FREE..          47*
*  58  12   0  88  -1*
**********************
* 88 ..FREE..           3*
* 786  12   0  87  -1*
**********************
* 87 ..FREE..          74*
* 612  12   0  89  -1*
**********************
* 89 ..FREE..         113*
* 218  12   0  77  -1*
**********************
* 77 ..FREE..           3*
* 699  12   0  85  -1*
**********************
* 85 ..FREE..          74*
* 882  11   0  80  -1*
**********************
* 80 ..FREE..          37*
* 603  12   0  70  -1*
**********************
* 70 ..FREE..          11*
*  39   0   0  76  -1*
**********************
* 76 ..FREE..           8*
* 523  12   0  75  -1*
**********************
* 75 ..FREE..          75*
*  84  10   0  74  -1*
**********************
* 74 ..FREE..          56*
* 730  10   0  73  -1*
**********************
* 73 ..FREE..           7*
* 333  10   0  72  -1*
**********************
```

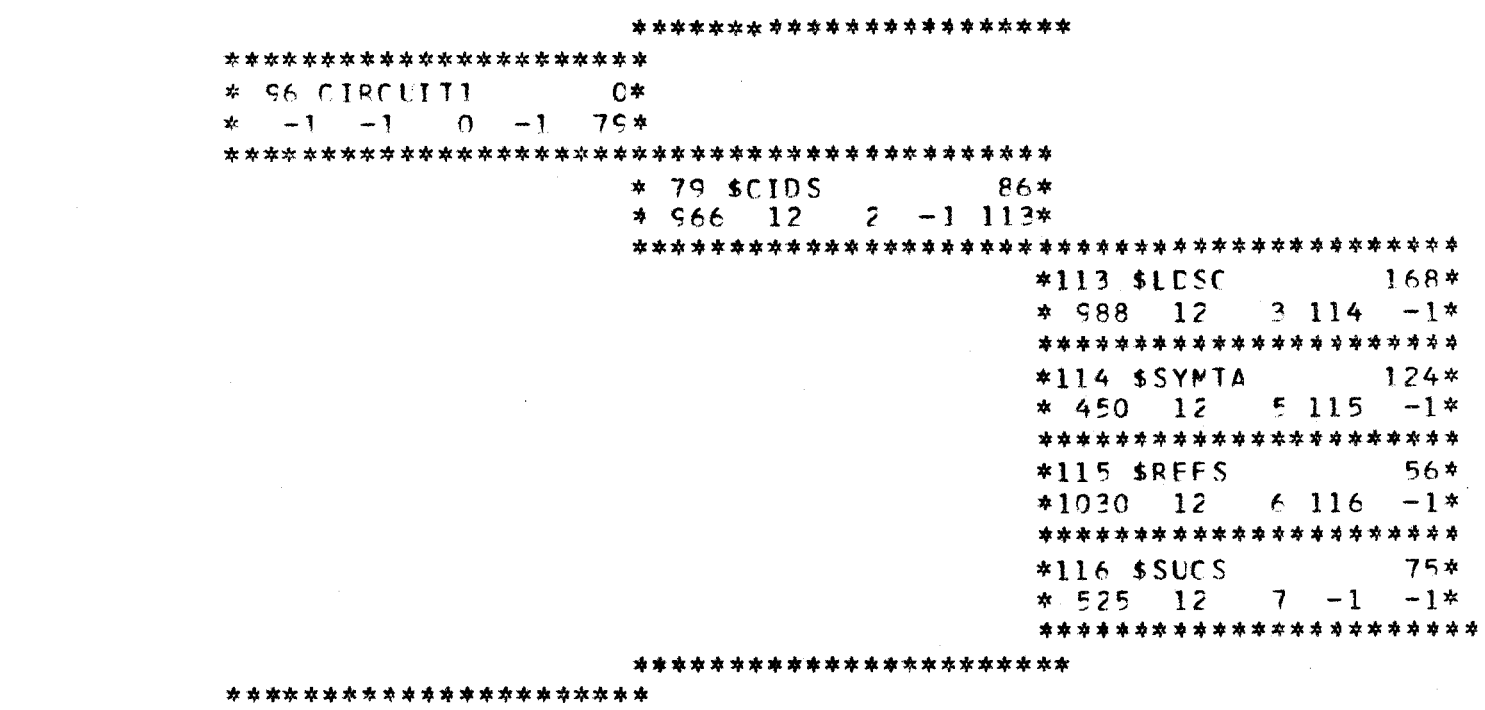
```
* 72 ..FREE..        36*
* 483  12   0  57  -1*
**********************
* 57 ..FREE..        29*
* 402  10   0  56  -1*
**********************
* 56 ..FREE..        20*
* 744  10   0  55  -1*
**********************
* 55 ..FREE..        65*
* 691  10   0  26  -1*
**********************
* 26 ..FREE..        26*
* 799  10   0  23  -1*
**********************
* 23 ..FREE..        34*
*  42   0   0  15  -1*
**********************
* 15 ..FREE..        11*
* 103  10   0  20  -1*
**********************
* 20 ..FREE..        38*
* 334  10   0  19  -1*
**********************
* 19 ..FREE..        65*
* 286  10   0  18  -1*
**********************
* 18 ..FREE..        52*
* 273  10   0  17  -1*
**********************
* 17 ..FREE..        46*
* 197  10   0   5  -1*
**********************
*  5 ..FREE..        31*
* 695  11   0  41  -1*
**********************
* 41 ..FREE..         8*
* 972  11   0  40  -1*
**********************
* 40 ..FREE..        31*
* 901  11   0  39  -1*
**********************
* 39 ..FREE..        65*
*  79   0   0  34  -1*
**********************
* 34 ..FREE..        77*
*  96   0   0  22  -1*
**********************
* 22 ..FREE..        31*
*  50   0   0   2  -1*
**********************
*  2 ..FREE..    194775*
*1718  12   0  -1  -1*
**********************
```


4 FAUST C
-1 -1 0 6 35
35 $OPTAB 324
408 10 14 -1 -1
6 TRATZF C
-1 -1 0 9 99
99 $OPTAB 324
1731 11 14 -1 -1
9 ALBLOCK 0
-1 -1 0 28 8
8 $CIDS 86
767 0 2 -1 10
10 $LDSC 25556
789 0 3 11 -1
11 $FMCS 18596
1778 3 4 12 -1
12 $REFS 266
1027 6 6 13 -1
13 $SUCS 10785
1094 6 7 14 -1
14 $SYMTA 13972
191 8 5 -1 -1
28 CC/0-7 C
-1 -1 0 43 27
27 $CIDS 86
803 10 2 -1 29
29 $LDSC 2280
825 10 3 30 -1
30 $FMCS 1668
1395 10 4 31 -1
31 $REFS 119
12 11 6 32 -1
32 $SUCS 1038
42 11 7 33 -1

```
                                                    * 33 $SYMTA       1276*
                                                    * 302  11    5  -1  -1*
                                                    ************************
                                  ************************
************************
* 43 EX1               0*
*  -1  -1    0  36  42*
*****************************************
                                  * 42 $CIDS            0*
                                  *  -1  -1    0  45  -1*
                                  ************************
                                  * 45 $CIDS           86*
                                  *  57   0    2  -1  44*
                                  ***************************************
                                                    * 44 $LDSC         410*
                                                    * 7C2  11    3  37  -1*
                                                    ************************
                                                    * 37 $FMCS         308*
                                                    * 8C5  11    4  38  -1*
                                                    ************************
                                                    * 38 $REFS          65*
                                                    * 678  11    6  46  -1*
                                                    ************************
                                                    * 46 $SUCS         162*
                                                    * 9C9  11    7  47  -1*
                                                    ************************
                                                    * 47 $SYMTA        256*
                                                    * 973  11    5  -1  -1*
                                                    ************************
                                  ************************
************************
* 36 ALUSLICE         0*
*  -1  -1    0  21    7*
*********************************************
                                  *  7 $CIDS           86*
                                  * 950  11    2  -1  48*
                                  ***************************************
                                                    * 48 $LDSC        10C4*
                                                    *1037  11    3  49  -1*
                                                    ************************
                                                    * 49 $FMCS         740*
                                                    *1288  11    4  50  -1*
                                                    ************************
                                                    * 50 $REFS         107*
                                                    *1473  11    6  52  -1*
                                                    ************************
                                                    * 52 $SUCS         342*
                                                    *1500  11    7  53  -1*
                                                    ************************
                                                    * 53 $SYMTA        5EC*
                                                    *1586  11    5  -1  -1*
                                                    ************************
                                  ************************
************************
* 21 EXAMPLE          C*
*  -1  -1    0  60  25*
*****************************************
```

```
                    * 25 $CICS          86*
                    * 489  10   2  62  16*
                    ***************************************
                                * 16 $LDSC          410*
                                * 511  10   3  24   -1*
                                ***********************
                                * 24 $FMCS          308*
                                * 614  10   4  54   -1*
                                ***********************
                                * 54 $REFS           65*
                                * 344  10   6  58   -1*
                                ***********************
                                * 58 $SUCS          162*
                                * 361  10   7  59   -1*
                                ***********************
                                * 59 $SYMTA         256*
                                * 209  10   5  -1   -1*
                                ***********************
                    ************************
                    * 62 $CTRES           0*
                    *  -1  -1  10  -1  61*
                    ********************************************
                                * 61 TEST#1           0*
                                *  -1  -1   0  -1   3*
                                ************************
                                *  3
                                * 74
                                ****
                                * 63
                                *105
                                ****
                                ************************
                    ************************
*********************
* 60 $COPT       261C*
* 114   C   1  65  -1*
*********************
* 65 DECODER2        0*
*  -1  -1   0  91  64*
*************************************************
                    * 64 $CICS          86*
                    * 708  10   2  -1  66*
                    ***********************************************
                                * 66 $LDSC          608*
                                * 245  12   3  67   -1*
                                ***********************
                                * 67 $SYMTA         364*
                                * 106  10   5  68   -1*
                                ***********************
                                * 68 $REFS           77*
                                *   C   C   6  69   -1*
                                ***********************
                                * 69 $SUCS          210*
                                * 397  12   7  -1   -1*
                                ***********************
                    ************************
*********************
* 91 DECODER         0*
*  -1  -1   0 101  9C*
*************************************************
```

```
                        * 90 $CIDS          86*
                        *  7C  12   2  -1  92*
                        ***************************************
                                        * 92 $LDSC         718*
                                        * 786  12   3  93  -1*
                                        ***********************
                                        * 93 $SYMTA        424*
                                        *  92  12   5  94  -1*
                                        ***********************
                                        * 94 $REFS          77*
                                        * 198  12   6  95  -1*
                                        ***********************
                                        * 95 $SUCS         27C*
                                        * 631  12   7  -1  -1*
                                        ***********************
                        ************************
***********************
*101 C35R1           0*
*  -1  -1   0 108 100*
***************************************
                        *100 $CIDS          86*
                        * 621  11   2  -1 102*
                        ***************************************
                                        *102 $LDSC         476*
                                        *1367  12   3 103  -1*
                                        ***********************
                                        *103 $SYMTA        292*
                                        *1486  12   5 104  -1*
                                        ***********************
                                        *104 $REFS          65*
                                        * 643  11   6 105  -1*
                                        ***********************
                                        *105 $SUCS         183*
                                        *  12  12   7 106  -1*
                                        ***********************
                                        *106 $FMCS         356*
                                        *1559  12   4  -1  -1*
                                        ***********************
                        ************************
***********************
*108 CTHRFS3         C*
*  -1  -1   0  96 107*
***************************************
                        *107 $CIDS          86*
                        * 718  12   2  -1 109*
                        ***************************************
                                        *109 $LDSC         278*
                                        *1648  12   3 110  -1*
                                        ***********************
                                        *11C $SYMTA        184*
                                        * 740  12   5 111  -1*
                                        ***********************
                                        *111 $REFS          56*
                                        * 660  11   6 112  -1*
                                        ***********************
                                        *112 $SUCS         117*
                                        * 303  10   7  -1  -1*
                                        ***********************
```



117 NODES IN THE DIR TREE 39 NODES IN THE FREE LIST.
91478 BYTES USED IN RECORDS. 196522 BYTES FREE.
69 UNUSED NODES.

We can refer to node number 30 as GC/0-7.$CIDS.$FMCS or GC/0-7.$FMCS, since both of these references are unambiguous. It could not be referred to as $CIDS.$FMCS because that is ambiguous.

SECTION 4. Maintenance of the DIALATOR file.

There are no user commands for the file system. All commands must be subroutine calls within a PL/1 program.

A utility program exists, which will list the file directory. It is stored in the data set with name SYSUT * and is called LISTDIR.

To use LISTDIR, the user must fetch the source stored under this name in SYSUT and submit it as an OS job.

There is a utility program which will delete a node plus all of its subset nodes (all nodes connected through its daughter link). This program is stored in SYSUT under the name DELNODE.

To use DELNODE the user must fetch the source, modify the name to be deleted as shown below, and submit the modified source as an OS job.

The procedure DELNODE will appear as follows (without the necessary JCL)

```
DELNODE: PROC OPTIONS(MAIN);
   DCL
   % INCLUDE FDIR,DELETE,LDIR,SDIR;
     I FIXED BIN(31);
     CALL FDIR;
     I=DELETE('CIRCUIT1');
     IF LDIR(0) > 0 THEN CALL SDIR;
   END DELNODE;
```

---

* The partitioned data sets are discussed in the General Programmer's Guide, Section 4.

The name desired to be deleted replaces CIRCUIT1. Remember that all of the subtree is deleted also.

To add or replace nodes in the tree one must put DISP=YES, DISP=OLD or DISP=NEW for TRAIZE and FAUST. Nodes may also be added through FAUST by stating the instruction SAVE in the FAUST statements. When adding nodes it is wise to examine the state of the tree. A summary of node availability is given at the bottom of the tree printout.

Here is a copy of the tree after the program DELNODE as shown above has been executed. Notice the effect on the tree (compare to the tree shown previously). The nodes deleted are CIRCUIT1 and all of its successors.

```
===== DIRECTORY LISTING =====

    96 AVAIL POINTER.
    40 REGIONS USED .
    24 STRUCTURES RECOGNIZED.
   185 NODES IN THE DIRECTORY.
   184 DESIRED NO. OF NODES.
    22 KEY-WORDS RECOGNIZED.
700811 DATE OF LAST CHANGE.


===== DIALATOR KEY-WORDS TABLE =====

NO   KEY-WORD  INDEX
  1                0
  2                0
  3                0
  4                0
  5                0
  6                0
  7                0
  8                0
  9  $CIDS         2
 10  $COPT         1
 11  $CTRES       10
 12  $DIATR       11
 13  $EMCS         4
 14  $LDSC         3
 15  $LVBS        13
 16  $OPTAB       14
 17  $REFS         6
 18  $SEMC         9
 19  $SUCS         7
 20  $SYMTA        5
 21  $TEDS        12
 22  $TERM         8

===== THE DIRECTORY TREE =====

**********************
*NO. REC NAME     SIZ*
* STR SRC TYP SIS DAU*
**********************
*   0 REC FILE      0*
*  -1  -1   0   4   1*
*****************************************
                     *  1 HEADFREE      0*
                     *  -1  -1   0  79  -1*
                     **********************
                     * 79 .FREE..      86*
                     * 966  12   0 116  -1*
                     **********************
                     *116 .FREE..      75*
                     * 525  12   0 115  -1*
                     **********************
```

```
*115  ..FREE..        56*
*1030  12    C 114   -1*
**********************
*114  ..FREE..       124*
* 450  12    C 113   -1*
**********************
*113  ..FREE..       168*
* 988  12    0  97   -1*
**********************
* 97  ..FREE..        37*
*1044  12    0  86   -1*
**********************
* 86  ..FREE..        74*
* 699  12    0  71   -1*
**********************
* 71  ..FREE..        11*
* 544  12    0  98   -1*
**********************
* 98  ..FREE..         8*
* 481  12    0  83   -1*
**********************
* 83  ..FREE..        75*
*  20   C    0  82   -1*
**********************
* 82  ..FREE..        56*
* 589  12    0  81   -1*
**********************
* 81  ..FREE..       124*
* 492  12    C  78   -1*
**********************
* 78  ..FREE..       168*
* 547  12    0  51   -1*
**********************
* 51  ..FREE..        21*
* 674  11    C  84   -1*
**********************
* 84  ..FREE..        47*
*  58  12    0  88   -1*
**********************
* 88  ..FREE..         3*
* 786  12    C  87   -1*
**********************
* 87  ..FREE..        74*
* 612  12    C  85   -1*
**********************
* 89  ..FREE..       113*
* 218  12    0  77   -1*
**********************
* 77  ..FREE..         3*
* 699  12    C  85   -1*
**********************
* 85  ..FREE..        74*
* 882  11    C  80   -1*
**********************
* 80  ..FREE..        37*
* 603  12    C  70   -1*
**********************
```

```
* 70 ..FREE..          11*
*  39   0   0  76  -1*
**********************
* 76 ..FREE..           8*
* 523  12   C  75  -1*
**********************
* 75 ..FREE..          75*
*  84  10   C  74  -1*
**********************
* 74 ..FREE..          56*
* 730  10   C  73  -1*
**********************
* 73 ..FREE..           7*
* 333  10   C  72  -1*
**********************
* 72 ..FREE..          36*
* 483  12   C  57  -1*
**********************
* 57 ..FREE..          29*
* 402  10   C  56  -1*
**********************
* 56 ..FREE..          20*
* 744  10   C  55  -1*
**********************
* 55 ..FREE..          65*
* 691  10   0  26  -1*
**********************
* 26 ..FREE..          26*
* 799  10   C  23  -1*
**********************
* 23 ..FREE..          34*
*  42   C   C  15  -1*
**********************
* 15 ..FREE..          11*
* 103  10   C  20  -1*
**********************
* 20 ..FREE..          38*
* 334  10   0  19  -1*
**********************
* 19 ..FREE..          65*
* 286  10   C  18  -1*
**********************
* 18 ..FREE..          52*
* 273  10   0  17  -1*
**********************
* 17 ..FREE..          46*
* 197  10   0   5  -1*
**********************
*  5 ..FREE..          31*
* 695  11   0  41  -1*
**********************
* 41 ..FREE..           8*
* 972  11   C  40  -1*
**********************
```

```
                        * 40 ..FREE..        31*
                        * 901  11   0  39  -1*
                        **********************
                        * 39 ..FREE..        65*
                        *  79   0   0  34  -1*
                        **********************
                        * 34 ..FREE..        77*
                        *  96   0   0  22  -1*
                        **********************
                        * 22 ..FREE..        31*
                        *  50   0   0   2  -1*
                        **********************
                        *  2 ..FREE..   194775*
                        *1718  12   0  -1  -1*
                        **********************
**********************
*  4 FAUST           0*
*  -1  -1   0   6  35*
**********************************************
                        * 35 $OPTAB         324*
                        * 408  10  14  -1  -1*
                        ************************
**********************
*  6 TRATZF          0*
*  -1  -1   0   9  99*
**********************************************
                        * 99 $OPTAB         324*
                        *1731  11  14  -1  -1*
                        ************************
**********************
*  9 ALBLOCK         0*
*  -1  -1   0  28   8*
**********************************************
                        *  8 $CIDS           86*
                        * 767   0   2  -1  10*
                        ************************************************
                                                * 10 $LDSC        25556*
                                                * 789   0   3  11  -1*
                                                ************************
                                                * 11 $FMCS        18596*
                                                *1778   3   4  12  -1*
                                                ************************
                                                * 12 $RFFS          266*
                                                *1027   6   6  13  -1*
                                                ************************
                                                * 13 $SUCS        10785*
                                                *1094   6   7  14  -1*
                                                ************************
                                                * 14 $SYMTA       13972*
                                                * 191   8   5  -1  -1*
                                                ************************
                        ************************
**********************
* 28 GC/0-7         0*
*  -1  -1   0  43  27*
**********************************************
```

```
                        * 27 $CIDS          86*
                        * 803  10   2  -1  29*
                        ***************************************
                                    * 29 $LDSC        2280*
                                    * 825  10   3  30  -1*
                                    ***********************
                                    * 30 $FMCS        1668*
                                    *1395  10   4  31  -1*
                                    ***********************
                                    * 31 $REFS         119*
                                    *  12  11   6  32  -1*
                                    ***********************
                                    * 32 $SUCS        1038*
                                    *  42  11   7  33  -1*
                                    ***********************
                                    * 33 $SYMTA       1276*
                                    * 302  11   5  -1  -1*
                                    ***********************
                        ************************
***********************
* 43 FX1              0*
*  -1  -1   0  36  42*
*****************************************
                        * 42 $CIDS           0*
                        *  -1  -1   0  45  -1*
                        ************************
                        * 45 $CIDS          86*
                        *  57   0   2  -1  44*
                        ***************************************
                                    * 44 $LDSC         410*
                                    * 702  11   3  37  -1*
                                    ***********************
                                    * 37 $FMCS         308*
                                    * 805  11   4  38  -1*
                                    ***********************
                                    * 38 $REFS          65*
                                    * 678  11   6  46  -1*
                                    ***********************
                                    * 46 $SUCS         162*
                                    * 909  11   7  47  -1*
                                    ***********************
                                    * 47 $SYMTA        256*
                                    * 973  11   5  -1  -1*
                                    ***********************
                        ************************
***********************
* 36 ALUSLICE         0*
*  -1  -1   0  21   7*
*****************************************
                        *  7 $CIDS          86*
                        * 950  11   2  -1  48*
                        ***************************************
                                    * 48 $LDSC        1004*
                                    *1037  11   3  49  -1*
                                    ***********************
                                    * 49 $FMCS         740*
                                    *1288  11   4  50  -1*
                                    ***********************
```

```
                                                    * 50 $REFS          107*
                                                    *1473   11    6   52   -1*
                                                    ************************
                                                    * 52 $SUCS          342*
                                                    *1500   11    7   53   -1*
                                                    ************************
                                                    * 53 $SYMTA         580*
                                                    *1586   11    5   -1   -1*
                                                    ************************
                                  ************************
************************
* 21 EXAMPLE          0*
*   -1   -1    0   60   25*
****************************************
                                  * 25 $CIDS          86*
                                  * 489   10    2   62   16*
                                  ****************************************
                                                    * 16 $LDSC          410*
                                                    * 511   10    3   24   -1*
                                                    ************************
                                                    * 24 $FMCS          308*
                                                    * 614   10    4   54   -1*
                                                    ************************
                                                    * 54 $REFS           65*
                                                    * 344   10    6   58   -1*
                                                    ************************
                                                    * 58 $SUCS          162*
                                                    * 361   10    7   59   -1*
                                                    ************************
                                                    * 59 $SYMTA         256*
                                                    * 209   10    5   -1   -1*
                                                    ************************
                                  ************************
                                  * 62 $CTRES           0*
                                  *   -1   -1   10   -1   61*
                                  ****************************************
                                                    * 61 TEST#1           0*
                                                    *   -1   -1    0   -1    3*
                                                    ************************
                                                                    *   3 $L V
                                                                    * 749    1
                                                                    ********
                                                                    * 63 $D I
                                                                    *1053    1
                                                                    ********
                                                    ************************
                                  ************************
************************
* 60 $COPT         2610*
* 114    0    1   65   -1*
************************
* 65 DECODER2          0*
*   -1   -1    0   91   64*
****************************************
                                  * 64 $CIDS          86*
                                  * 708   10    2   -1   66*
                                  ****************************************
```

```
                                                * 66 $LDSC          6C8*
                                                * 245  12    3  67  -1*
                                                **********************
                                                * 67 $SYMTA         364*
                                                * 106  10    5  68  -1*
                                                **********************
                                                * 68 $REFS           77*
                                                *   0    0    6  69  -1*
                                                **********************
                                                * 69 $SUCS          210*
                                                * 397  12    7  -1  -1*
                                                **********************
                          ************************
**********************
* 91 DECODER          C*
*  -1   -1    0 101  90*
*****************************************
                          * 90 $CIDS           86*
                          *  70  12    2  -1  92*
                          *****************************************
                                                * 92 $LDSC          718*
                                                * 786  12    3  93  -1*
                                                **********************
                                                * 93 $SYMTA         424*
                                                *  92  12    5  94  -1*
                                                **********************
                                                * 94 $REFS           77*
                                                * 198  12    6  95  -1*
                                                **********************
                                                * 95 $SUCS          270*
                                                * 631  12    7  -1  -1*
                                                **********************
                          ************************
**********************
*101 C35R1           C*
*  -1   -1    0 108 10C*
*****************************************
                          *100 $CIDS           86*
                          * 621  11    2  -1 102*
                          *****************************************
                                                *102 $LDSC          476*
                                                *1367  12    3 1C3  -1*
                                                **********************
                                                *103 $SYMTA         292*
                                                *1466  12    5 1C4  -1*
                                                **********************
                                                *104 $REFS           65*
                                                * 643  11    6 1C5  -1*
                                                **********************
                                                *105 $SUCS          183*
                                                *  12  12    7 1C6  -1*
                                                **********************
                                                *106 $FMCS          356*
                                                *1559  12    4  -1  -1*
                                                **********************
                          ************************
```

```
**********************
*108 CTHRES3          0*
*  -1  -1   0  -1 107*
*************************************************
                        *107 $CIDS          86*
                        * 718  12   2  -1 109*
                        ************************************************
                                              *109 $LCSC          278*
                                              *1648  12   3 110  -1*
                                              **********************
                                              *110 $SYMTA         184*
                                              * 740  12   5 111  -1*
                                              **********************
                                              *111 $REFS           56*
                                              * 660  11   6 112  -1*
                                              **********************
                                              *112 $SUCS          117*
                                              * 303  10   7  -1  -1*
                                              **********************
                        ************************
************************
```

116 NODES IN THE DIR TREE 44 NODES IN THE FREE LIST.
50969 BYTES USED IN RECORDS, 197031 BYTES FREE.
70 UNUSED NODES.

==SDIR==DIRECTORY REWRITTEN 700815 013251550