

~ 1 ~ Array Processing

Array Processing, Scrolling Large Amounts of Data

This sample program and the one that follows presents a situation where there are multiple occurrences of data are to be displayed. That data need not be an array but a large number of records that the end user would like to scroll through while viewing. These examples illustrate how to show a limited number of occurrences on screen and the scrolling code involved for the presentation.

Many other techniques can be added to this code for the selection of one or more records for detailed processing and other processing required by the end user.

```
0010 **
0020 ** SHELL PROGRAM EXAMPLE OF DISPLAYING ARRAY(S) ON A SCREEN AND CONTROL
0030 ** OF FORWARD AND BACKWARD POSITION USING TWO DESIGNATED KEYS.
0040 ** THE ASSUMPTION MADE IN THIS EXAMPLE IS THE DISPLAY OF A LARGE ARRAY
0050 ** WITH 12 OCCURRENCES BEING DISPLAYED ON SCREEN AT ANY ONE TIME.
0060 ** THE SCROLL MECHANISM WILL NOT PERMIT SCROLLING BEYOND THE FIRST
0070 ** INDEX OF THE ARRAY. NO SCROLLING IS PERMITTED BEYOND THE LAST PAGE
0080 ** OF THE ARRAY, THAT IS TO SAY, THE END OF THE ARRAY AND THE PAGE IS
0090 ** IS DISPLAYED ON. IF ONLY A FEW OCCURRENCES ARE DISPLAYED, NO FURTHER
0100 ** PAGING IS PERMITTED EVEN THOUGH THE PHYSICAL STRUCTURE IS DEFINED
0110 ** FAR PAST THE TOTAL OCCURRENCES OF THE ARRAY.
0120 ** VARIABLES USED FOR CONTROL PURPOSES:
0130 ** #INDEX(I2) INIT <1> USED TO DISPLAY A STARTING OCCURRENCE OF THE ARRAY
0140 ** #END-INDEX(I2) USED FOR LAST PAGE PROCESS
0150 ** #TOP-INDEX(I2) CONTAINS HIGHEST VALUE OF #INDEX (TOTAL OCCURRENCES)
0160 ** #J COUNTS THE PASSES THROUGH THE LOAD PROCESS; INITIS #TOP-INDEX
0170 **
0180 **
0190 **
0200 **
0210 DEFINE DATA
0220 LOCAL
0230 1 VEHICLES VIEW OF VEHICLES
0240   2 REG-NUM
0250   2 MAKE
0260   2 MODEL
0270   2 COLOR
0280   2 YEAR
0290   2 CLASS
0300   2 LEASE-PUR
0310 * MAP FIELDS
0320 1 #REG-NUM          (A15/256)
0330 1 #MAKE-MODEL     (A20/256)
0340 1 #COLOR-YEAR     (A14/256)
0350 1 #CLASS          (A08/256)
0360 1 #LEASED         (A08/256)
0370 1 #CLEAR          (C/256)
0380 1 #INDEX          (I2) INIT <1>
0390 1 #END-INDEX      (I2)
0400 1 #TOP-INDEX      (I2)
0410 1 #END-OF-DATA    (L)
0420 * USER FIELDS
0430 1 #J              (I2)
0440 1 #TABLE-COUNT    (I2)
0450 1 #COLOR-KEY      (A10)
0460 END-DEFINE
```

The maximum size of any array is 32K. These numbers can be bumped for larger arrays as long as you don't exceed 32K. Under Natural v4, the maximum array size is 1GB.

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```
0470 *
0480 SET KEY ALL
0490 *
0500 MOVE 'GREEN' TO #COLOR-KEY
0510 *
0520 READ VEHICLES BY COLOR = #COLOR-KEY THRU #COLOR-KEY
0530 *
0540   ADD 1 TO #J
0550   IF REG-NUM GT ' '
0560     MOVE REG-NUM TO #REG-NUM(#J)
0570   END-IF
0580   COMPRESS MAKE MODEL INTO #MAKE-MODEL(#J)
0590   COMPRESS COLOR YEAR INTO #COLOR-YEAR(#J)
0600   IF CLASS = 'P'
0610     MOVE 'PRIVATE' TO #CLASS(#J)
0620   ELSE MOVE 'COMPANY' TO #LEASED(#J)
0630   END-IF
0640   IF LEASE-PUR = 'L'
0650     MOVE 'LEASED' TO #LEASED(#J)
0660   ELSE MOVE 'PURCHASED' TO #LEASED(#J)
0670   END-IF
0680 *
0690   AT END OF DATA
0700     MOVE #J TO #TOP-INDEX
0710     ADD 1 TO #J
0720     MOVE '** End of Data **' TO #MAKE-MODEL(#J)
0730   END-ENDDATA
0740 *
0750 END-READ
0760 *
0770 REPEAT
0780 *
0790   INPUT (AD=MI'_' CD=YE IP=OFF)
0800     3/2 'REGISTRATION'(YE) 4X 'MAKE & MODEL'(YE) 9X 'COLOR & YEAR'(YE)
0810     3X 'CLASS   LEASED'(YE)
0820     5/2 #REG-NUM(#INDEX) (CV=#CLEAR(#INDEX))
0830     #MAKE-MODEL(#INDEX) (CV=#CLEAR(#INDEX))
0840     #COLOR-YEAR(#INDEX) (CV=#CLEAR(#INDEX))
0850     #CLASS(#INDEX) (CV=#CLEAR(#INDEX))
0860     #LEASED(#INDEX) (CV=#CLEAR(#INDEX))
0870     6/2 #REG-NUM(#INDEX + 1) (CV=#CLEAR(#INDEX + 1))
0880     #MAKE-MODEL(#INDEX + 1) (CV=#CLEAR(#INDEX + 1))
0890     #COLOR-YEAR(#INDEX + 1) (CV=#CLEAR(#INDEX + 1))
0900     #CLASS(#INDEX + 1) (CV=#CLEAR(#INDEX + 1))
0910     #LEASED(#INDEX + 1) (CV=#CLEAR(#INDEX + 1))
0920     7/2 #REG-NUM(#INDEX + 2) (CV=#CLEAR(#INDEX + 2))
0930     #MAKE-MODEL(#INDEX + 2) (CV=#CLEAR(#INDEX + 2))
0940     #COLOR-YEAR(#INDEX + 2) (CV=#CLEAR(#INDEX + 2))
0950     #CLASS(#INDEX + 2) (CV=#CLEAR(#INDEX + 2))
0960     #LEASED(#INDEX + 2) (CV=#CLEAR(#INDEX + 2))
0970     8/2 #REG-NUM(#INDEX + 3) (CV=#CLEAR(#INDEX + 3))
0980     #MAKE-MODEL(#INDEX + 3) (CV=#CLEAR(#INDEX + 3))
0990     #COLOR-YEAR(#INDEX + 3) (CV=#CLEAR(#INDEX + 3))
1000     #CLASS(#INDEX + 3) (CV=#CLEAR(#INDEX + 3))
1010     #LEASED(#INDEX + 3) (CV=#CLEAR(#INDEX + 3))
1020     9/2 #REG-NUM(#INDEX + 4) (CV=#CLEAR(#INDEX + 4))
1030     #MAKE-MODEL(#INDEX + 4) (CV=#CLEAR(#INDEX + 4))
1040     #COLOR-YEAR(#INDEX + 4) (CV=#CLEAR(#INDEX + 4))
1050     #CLASS(#INDEX + 4) (CV=#CLEAR(#INDEX + 4))
1060     #LEASED(#INDEX + 4) (CV=#CLEAR(#INDEX + 4))
```

The READ loop is used to populate the array before any element is displayed.

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```
1070      10/2 #REG-NUM(#INDEX + 5) (CV=#CLEAR(#INDEX + 5))
1080      #MAKE-MODEL(#INDEX + 5) (CV=#CLEAR(#INDEX + 5))
1090      #COLOR-YEAR(#INDEX + 5) (CV=#CLEAR(#INDEX + 5))
1100      #CLASS(#INDEX + 5) (CV=#CLEAR(#INDEX + 5))
1110      #LEASED(#INDEX + 5) (CV=#CLEAR(#INDEX + 5))
1120      11/2 #REG-NUM(#INDEX + 6) (CV=#CLEAR(#INDEX + 6))
1130      #MAKE-MODEL(#INDEX + 6) (CV=#CLEAR(#INDEX + 6))
1140      #COLOR-YEAR(#INDEX + 6) (CV=#CLEAR(#INDEX + 6))
1150      #CLASS(#INDEX + 6) (CV=#CLEAR(#INDEX + 6))
1160      #LEASED(#INDEX + 6) (CV=#CLEAR(#INDEX + 6))
1170      12/2 #REG-NUM(#INDEX + 7) (CV=#CLEAR(#INDEX + 7))
1180      #MAKE-MODEL(#INDEX + 7) (CV=#CLEAR(#INDEX + 7))
1190      #COLOR-YEAR(#INDEX + 7) (CV=#CLEAR(#INDEX + 7))
1200      #CLASS(#INDEX + 7) (CV=#CLEAR(#INDEX + 7))
1210      #LEASED(#INDEX + 7) (CV=#CLEAR(#INDEX + 7))
1220      13/2 #REG-NUM(#INDEX + 8) (CV=#CLEAR(#INDEX + 8))
1230      #MAKE-MODEL(#INDEX + 8) (CV=#CLEAR(#INDEX + 8))
1240      #COLOR-YEAR(#INDEX + 8) (CV=#CLEAR(#INDEX + 8))
1250      #CLASS(#INDEX + 8) (CV=#CLEAR(#INDEX + 8))
1260      #LEASED(#INDEX + 8) (CV=#CLEAR(#INDEX + 8))
1270      14/2 #REG-NUM(#INDEX + 9) (CV=#CLEAR(#INDEX + 9))
1280      #MAKE-MODEL(#INDEX + 9) (CV=#CLEAR(#INDEX + 9))
1290      #COLOR-YEAR(#INDEX + 9) (CV=#CLEAR(#INDEX + 9))
1300      #CLASS(#INDEX + 9) (CV=#CLEAR(#INDEX + 9))
1310      #LEASED(#INDEX + 9) (CV=#CLEAR(#INDEX + 9))
1320      15/2 #REG-NUM(#INDEX + 10) (CV=#CLEAR(#INDEX + 10))
1330      #MAKE-MODEL(#INDEX + 10) (CV=#CLEAR(#INDEX + 10))
1340      #COLOR-YEAR(#INDEX + 10) (CV=#CLEAR(#INDEX + 10))
1350      #CLASS(#INDEX + 10) (CV=#CLEAR(#INDEX + 10))
1360      #LEASED(#INDEX + 10) (CV=#CLEAR(#INDEX + 10))
1370      16/2 #REG-NUM(#INDEX + 11) (CV=#CLEAR(#INDEX + 11))
1380      #MAKE-MODEL(#INDEX + 11) (CV=#CLEAR(#INDEX + 11))
1390      #COLOR-YEAR(#INDEX + 11) (CV=#CLEAR(#INDEX + 11))
1400      #CLASS(#INDEX + 11) (CV=#CLEAR(#INDEX + 11))
1410      #LEASED(#INDEX + 11) (CV=#CLEAR(#INDEX + 11))
1420      19/3 'INDEX'(YE) #INDEX (AD=0 NL=3)
1430      'END INDEX'(YE) #END-INDEX (AD=0 NL=3)
1440      'TOP INDEX'(YE) #TOP-INDEX (AD=0 NL=3)
1450      'PF3=QUIT PF10=BACK PF11=FORWARD'(YE)
1460 *
1470      IF *PF-KEY = 'PF3'
1480          ESCAPE ROUTINE
1490      END-IF
1500 *
1510      IF *PF-KEY = 'PF11'
1520          ADD 12 TO #INDEX
1530          IF #END-OF-DATA
1540              MOVE #END-INDEX TO #INDEX
1550              ESCAPE TOP
1560          END-IF
1570          IF #INDEX GT ((#TOP-INDEX / 12) * 12)
1580              COMPUTE #END-INDEX = #INDEX = ((#TOP-INDEX / 12) * 12) + 1
1590              MOVE TRUE TO #END-OF-DATA
1600          END-IF
1610          ESCAPE TOP
1620      END-IF
1630 *
```

This IF statement controls the forward scrolling mechanism. #INDEX is used to establish which element is to be loaded on the screen and is used to tell the program how far to scroll and when to stop scrolling.

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```
1640 IF *PF-KEY = 'PF10'
1650     SUBTRACT 12 FROM #INDEX
1660     MOVE FALSE TO #END-OF-DATA
1670     IF #INDEX LT 1
1680         MOVE 1 TO #INDEX
1690     END-IF
1700     ESCAPE TOP
1710 END-IF
1720 *
1730 END-REPEAT
1740 *
1750 END
```

This IF statement controls backward scrolling. Again #INDEX is set so the proper elements are displayed on screen. The embedded IF insures no processing beyond the first

Check and run your program.

```
REGISTRATION      MAKE & MODEL          COLOR & YEAR  CLASS  LEASED
30691501_____ GENERAL MOTORS CHEVR GREEN 77_____ PRIVATE_ LEASED__
30692551_____ FORD PINTO_____ GREEN 77_____ _____ PURCHASE
30704515_____ GENERAL MOTORS CHEVR GREEN 77_____ PRIVATE_ LEASED__
30714240_____ VOLVO DL_____ GREEN 77_____ _____ PURCHASE
30758869_____ CHRYSLER DODGE_____ GREEN 79_____ _____ PURCHASE
30793773_____ GENERAL MOTORS OLDSM GREEN 82_____ _____ PURCHASE
30808287_____ PORSCHE 914_____ GREEN 77_____ _____ PURCHASE
30815397_____ GENERAL MOTORS CHEVR GREEN 80_____ _____ PURCHASE
30828677_____ CHRYSLER DODGE_____ GREEN 80_____ _____ PURCHASE
30840723_____ GENERAL MOTORS CHEVR GREEN 81_____ _____ PURCHASE
30890141_____ TOYOTA CRESSIDA_____ GREEN 84_____ _____ PURCHASE
30909591_____ FORD LINCOLN_____ GREEN 86_____ _____ PURCHASE

INDEX      1 END INDEX      TOP INDEX      38 PF3=QUIT PF10=BACK PF11=FORWARD
```

The value in INDEX is the occurrence at the first line on the screen. The cursor is positioned under the "3" on the REGISTRATION value on the first line.

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Press PF11 to scroll forward one "page".

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
30923958	GENERAL MOTORS CHEVR	GREEN 77		PURCHASE
30949284	CHRYSLER PLYMOUTH	GREEN 83		PURCHASE
30992679	LAMBORGHINI P 400	GREEN 85		PURCHASE
30999789	CHRYSLER PLYMOUTH	GREEN 83	PRIVATE	PURCHASE
31015537	FIAT 850 S	GREEN 83		PURCHASE
31026349	CHRYSLER PLYMOUTH	GREEN 83	PRIVATE	PURCHASE
C545 MAU	FORD ORION 1.6 GHIA	GREEN 85		LEASED
C287 KAU	FORD ORION 1.6 GHIA	GREEN 85		LEASED
C715 LAU	FORD ORION 1.6 GHIA	GREEN 86		LEASED
C151 PCH	FORD SIERRA 1.6	GREEN 86		LEASED
ABC 345X	AUSTIN MINI	GREEN 80		PURCHASE
C457 DFB	VAUXHALL CAVALIER	GREEN 85		LEASED

INDEX 13 END INDEX TOP INDEX 38 PF3=QUIT PF10=BACK PF11=FORWARD

30923958 is the thirteenth record in the group of 38 that meet the search criteria. C457 DFB is the twenty-fourth record of the same group. Press PF11 again.

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
A657 ERB	VAUXHALL ASTRA 1.3	GREEN 83		PURCHASE
C357 TRY	FORD ORION 1.6	GREEN 85		LEASED
KKU 629Y	FORD ESCORT 1.3	GREEN 82		PURCHASE
B146 DGN	HONDA CIVIC	GREEN 84		PURCHASE
B335 EFR	FORD FIESTA	GREEN 85	PRIVATE	PURCHASE
AFG 563Y	VAUXHALL CHEVETTE	GREEN 82	PRIVATE	PURCHASE
A679 YYT	FORD ESCORT 1.3	GREEN 84	PRIVATE	PURCHASE
A372 TYT	FORD FIESTA	GREEN 84	PRIVATE	PURCHASE
A364 FGY	FORD SIERRA 1.6	GREEN 83		PURCHASE
B678 FGY	FORD FIESTA	GREEN 85		PURCHASE
B553 DDT	FORD ESCORT 1.3	GREEN 84		PURCHASE
BCH 472X	MORRIS MINOR 1000	GREEN 80		PURCHASE

INDEX 25 END INDEX TOP INDEX 38 PF3=QUIT PF10=BACK PF11=FORWARD

A657 ERB is the twenty-fifth member of the group and BCH 472X is the thirty-sixth record of the same group. Press PF11 one more time.

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Check and RUN and scroll to the "last" page and you'll witness:

```
REGISTRATION      MAKE & MODEL      COLOR & YEAR      CLASS      LEASED
B47 XAU           FORD ESCORT 1.3   GREEN 85           PURCHASE
TCH 709Y         MORRIS MARINA     GREEN 81           PURCHASE
** End of Data **

INDEX    37 END INDEX    37 TOP INDEX    38 PF3=QUIT PF10=BACK PF11=FORWARD
```

As it stands right now, this program is only executed once for a specific group of data. Oftentimes this type of program needs to be re-executed more than once so to make the program recurrent by applying the following changes:

```
0470 *
0480 SET KEY ALL
0490 *
0500 REPEAT
0510 *
0520 READ VEHICLES BY COLOR = #COLOR-KEY THRU #COLOR-KEY
0530 *
```

There is already a REPEAT loop wrapped around the INPUT statement. This REPEAT will bring control back to the read for another group of records to be retrieved.

```
0820 INPUT (AD=MT'_' CD=YE IP=OFF)
0830 MARK FIELD *#COLOR-KEY
0840 3/2 'REGISTRATION'(YE) 4X 'MAKE & MODEL'(YE) 9X 'COLOR & YEAR'(YE)*
```

Add the variable #COLOR-KEY to the INPUT statement. This allows the user type in a new set of search criteria.

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```
1450      #LEASED(#INDEX + 11) (CV=#CLEAR(#INDEX + 11))
1460      18/28 'New Color?' (YE) #COLOR-KEY (AD=AT'_' )
1470      20/3 'INDEX' (YE) #INDEX (AD=O NL=3)
1480      'END INDEX' (YE) #END-INDEX (AD=O NL=3)
1490      'TOP INDEX' (YE) #TOP-INDEX (AD=O NL=3)
1500      'PF3=QUIT PF10=BACK PF11=FORWARD' (YE)
1510 *
1520      IF #COLOR-KEY GT ' '
1530          RESET #REG-NUM(*) #MAKE-MODEL(*) #COLOR-YEAR(*) #CLASS(*)
1540          #LEASED(*) #CLEAR(*) #END-INDEX #TOP-INDEX #END-OF-DATA #J
1550          RESET INITIAL #INDEX
1560          ESCAPE BOTTOM /* Leave the MINOR-LOOP.
1570      END-IF
1580 *
```

Add the input field #COLOR-KEY and position it under the COLOR column. The MARK FIELD option positions the cursor in #COLOR-KEY with each screen presented. See example output on the next page.

```
1720 *
1730     END-REPEAT
1740 END-REPEAT
1750 *
1760 END
```

Insert another END-REPEAT after the end of the INPUT “loop” to close the READ block properly.

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Map Editor Alternative

The INPUT statement takes up too many source lines so if you want to replace that huge INPUT statement with an external map, continue on.

STOW the program as "xxsvu". Use another name if you would like but remember it and use it in place of any references to "xxsvu" in the narrative that follows.

Let's use the output from the first screen as our template in constructing the map using Natural's Map Editor

```
REGISTRATION      MAKE & MODEL          COLOR & YEAR      CLASS      LEASED
30691501_____  GENERAL MOTORS CHEVR  GREEN 77_____  PRIVATE_  LEASED__
30692551_____  FORD PINTO_____    GREEN 77_____  _____  PURCHASE
30704515_____  GENERAL MOTORS CHEVR  GREEN 77_____  PRIVATE_  LEASED__
30714240_____  VOLVO DL_____      GREEN 77_____  _____  PURCHASE
30758869_____  CHRYSLER DODGE_____ GREEN 79_____  _____  PURCHASE
30793773_____  GENERAL MOTORS OLDSM  GREEN 82_____  _____  PURCHASE
30808287_____  PORSCHE 914_____    GREEN 77_____  _____  PURCHASE
30815397_____  GENERAL MOTORS CHEVR  GREEN 80_____  _____  PURCHASE
30828677_____  CHRYSLER DODGE_____ GREEN 80_____  _____  PURCHASE
30840723_____  GENERAL MOTORS CHEVR  GREEN 81_____  _____  PURCHASE
30890141_____  TOYOTA CRESSIDA_____ GREEN 84_____  _____  PURCHASE
30909591_____  FORD LINCOLN_____   GREEN 86_____  _____  PURCHASE

New Color? _____
INDEX      1 END INDEX      TOP INDEX      38 PF3=QUIT PF10=BACK PF11=FORWARD
```

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```
12:34:56          ***** NATURAL MAP EDITOR *****          10/31/04
User DDHAMIL          - Edit Map -          Library DDHAMIL

Code      Function
-----
D      Field and Variable Definitions
E      Edit Map
I      Initialize new Map
H      Initialize a new Help Map
M      Maintenance of Profiles & Devices
S      Save Map
T      Test Map
W      Stow Map
?      Help
.      Exit

Code .. I      Name .. xxsvv_____      Profile .. SYSPROF_

Command ==>
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12-
      Help      Exit  Test  Edit
```

```
12:24:32          Define Map Settings for MAP          10/31/04

Delimiters          Format          Context
-----
Cls Att CD  Del  Page Size ..... 23      Device Check .... _____
T  D      BLANK  Line Size ..... 79      WRITE Statement  _
T  I      ?      Column Shift ... 0 (0/1)  INPUT Statement  X
A  D      _      Layout ..... _____  Help            _____
A  I      )      dynamic ..... N (Y/N)  as field default N (Y/N)
A  N      ▸      Zero Print ..... N (Y/N)
M  D      &      Case Default ... UC (UC/LC)
M  I      :      Manual Skip .... N (Y/N)  Automatic Rule Rank 1
O  D      +      Decimal Char ... .      Profile Name .... SYSPROF
O  I      (      Standard Keys .. N (Y/N)
Justification .. L (L/R)
Print Mode ..... _

Control Var .... _____

Optional, Partial .... _
Required, Partial ....
Optional, Complete ...
Required, Complete ...

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12-
      Help      Exit            Let
```

Set Filler Characters, Optional, Partial to an underscore and press the enter key once to accept your change and a second time to continue on into the Map Editor proper.

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Load the program into the Observation Window.

```
Ob p xxsvu_          Ob D CLS ATT  DEL      CLS ATT  DEL
.                   .   T  D   Blnk    T  I   ?
.                   .   A  D   _       A  I   )
.                   .   A  N   ^       M  D   &
.                   .   M  I   :       O  D   +
.                   .   O  I   (
.
001  --010---+-----+-----030---+-----+-----050---+-----+-----070---+-----

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit  Test  Edit  --   -   +   Full  <   >   Let
```

```
Ob P XXSVU          Ob D CLS ATT  DEL      CLS ATT  DEL
. VEHICLES          *V1  .   T  D   Blnk    T  I   ?
1 REG-NUM           A15  .   A  D   _       A  I   )
2 MAKE              A20  .   A  N   ^       M  D   &
3 MODEL            A20  .   M  I   :       O  D   +
4 COLOR            A10  .   O  I   (
5 YEAR             N2.0  .
001  --010---+-----+-----030---+-----+-----050---+-----+-----070---+-----

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit  Test  Edit  --   -   +   Full  <   >   Let
```

You can scroll the Observation Window by typing a "+", plus sign, over the "P" and press the ENTER key. Type a "-", minus sign, to scroll backward. The scrolling increment is 6 lines at a time.

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Position a specific field at the top of the Observation Window

Type a question mark over the first 'X' of 'XXSUV' and press the ENTER key. The "Select field to be topped" menu is invoked (see below). Using this menu, it is much easier to position a field at the top of the Observation Window rather than scroll 6 lines at a time to bring a specific into view.

```
12:27:37      Name XXSVU      10/31/04
  I T L NAME          FMT  INDEX
-----
 1  V 1 VEHICLES
 2  2 REG-NUM          A15
 3  2 MAKE             A20
 4  2 MODEL            A20
 5  2 COLOR            A10
 6  2 YEAR             N2.0
 7  2 CLASS            A1
 8  2 LEASE-PUR        A1
 9  1 #REG-NUM         A15  (256)
10  1 #MAKE-MODEL      A20  (256)
11  1 #COLOR-YEAR      A14  (256)
12  1 #CLASS           A8   (256)
13  1 #LEASED          A8   (256)
14  1 #INDEX           I2
15  1 #END-INDEX       I2
16  1 #TOP-INDEX       I2
17  1 #END-OF-DATA     L
18  1 #J               I2
19  1 #TABLE-COUNT     I2
9_ Select field to be topped      '.' to quit, +,-,--,++ to position
```

Type a 9 in the "Select field to be topped" parameter and press the ENTER key.

```
Ob P XXSVU          Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM          A15  .   T D   Blnk   T I   ?
2 #MAKE-MODEL       A20  .   A D   _      A I   )
3 #COLOR-YEAR       A14  .   A N   ^      M D   &
4 #CLASS            A8   .   M I   :      O D   +
5 #LEASED           A8   .   O I   (
6 #INDEX            I2   .
001  --010---+---+---+---030---+---+---+---050---+---+---+---070---+---

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help Mset Exit Test Edit  --  -   +   Full <   >   Let
```

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Position #REG-NUM on line 5 at column 3 and type a delimiter character followed by the sequence number of #REG-NUM from the Observation Window (see below) and then press the ENTER key.

```
Ob P XXSVU                               Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM                               A15  .   T D   Blnk    T I   ?
2 #MAKE-MODEL                             A20  .   A D   _       A I   )
3 #COLOR-YEAR                              A14  .   A N   ~       M D   &
4 #CLASS                                   A8   .   M I   :       O D   +
5 #LEASED                                  A8   .   O I   (
6 #INDEX                                   I2   .

001  --010---+-----+-----+---030---+-----+-----+---050---+-----+-----+---070---+-----

&1

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit  Test  Edit  --   -   +   Full  <   >   Let
```

The Map Editor will expand the 1 into the first field in the Observation Window to its full width as defined in the program. An X represents an alphanumeric variable. Since this is a 15 byte field, fifteen X's will be displayed.

```
Ob P XXSVU                               Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM                               A15  .   T D   Blnk    T I   ?
2 #MAKE-MODEL                             A20  .   A D   _       A I   )
3 #COLOR-YEAR                              A14  .   A N   ~       M D   &
4 #CLASS                                   A8   .   M I   :       O D   +
5 #LEASED                                  A8   .   O I   (
6 #INDEX                                   I2   .

001  --010---+-----+-----+---030---+-----+-----+---050---+-----+-----+---070---+-----

&XXXXXXXXXXXXXXXXXXXXX

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit  Test  Edit  --   -   +   Full  <   >   Let
```

~ 14 ~ Array Processing

Incorporation

Bring down #MAKE-MODEL using the same "incorporation" technique.

```
Ob P XXSVU                               Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM                               A15  .   T D   Blnk   T I   ?
2 #MAKE-MODEL                             A20  .   A D   _      A I   )
3 #COLOR-YEAR                             A14  .   A N   ▯      M D   &
4 #CLASS                                  A8   .   M I   :      O D   +
5 #LEASED                                  A8   .   O I   (
6 #INDEX                                  I2   .
001  --010---+-----+-----+---030---+-----+-----+---050---+-----+-----+---070---+-----

&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXXXXXXXXXX

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help Mset Exit Test Edit --  -   +   Full <   >   Let
```

Do the same for the remainder of the array elements leaving 3 spaces between the end of one field and the beginning of the next. Include the delimiter character in your count because it is not displayed on the screen when executed.

Afterwards, insert the column headers as illustrated in the next screen.

~ 15 ~ Array Processing

```

Ob P XXSVU                               Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM                                A15  .   T D   Blnk    T I   ?
2 #MAKE-MODEL                             A20  .   A D   _       A I   )
3 #COLOR-YEAR                             A14  .   A N   ~       M D   &
4 #CLASS                                  A8   .   M I   :       O D   +
5 #LEASED                                  A8   .   O I   (
6 #INDEX                                   I2   .
001  --010---+-----+-----+---030---+-----+-----+---050---+-----+-----+---070---+-----

      REGISTRATION          MAKE & MODEL          COLOR & YEAR          CLASS          LEASED
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit  Test  Edit  --  -  +  Full <  >  Let
  
```

Position the cursor at the extreme left of the line where all the are elements are defined and type the line command “..a” and press the ENTER key.

```

Ob P XXSVU                               Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM                                A15  .   T D   Blnk    T I   ?
2 #MAKE-MODEL                             A20  .   A D   _       A I   )
3 #COLOR-YEAR                             A14  .   A N   ~       M D   &
4 #CLASS                                  A8   .   M I   :       O D   +
5 #LEASED                                  A8   .   O I   (
6 #INDEX                                   I2   .
001  --010---+-----+-----+---030---+-----+-----+---050---+-----+-----+---070---+-----

      REGISTRATION          MAKE & MODEL          COLOR & YEAR          CLASS          LEASED
..aXXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit  Test  Edit  --  -  +  Full <  >  Let
  
```

~ 16 ~ Array Processing

```

12:34:56          ***** NATURAL MAP EDITOR *****          10/31/04
                    - Array Table Definition -

Main   Index:  Vert. Occur.   1   Starting from _____ Spacing 0   Lines
Second Index:  Direction(H/V) H           _____         1   Cls/Ls
Third  Index:  Direction(H/V) V           _____         0   Cls/Ls
-----
Name of Variable      Col   Dimension Size   Order   2.Ind  3.Ind
(truncated)          Pos   Ind1  Ind2  Ind3   M S T   Occ.  Occ.
-----
#REG-NUM              4    256   1    1     1
#MAKE-MODEL          21    256   1    1     1
#COLOR-YEAR          43    256   1    1     1
#CLASS               59    256   1    1     1
#LEASED              69    256   1    1     1

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit      --   -   +                               Let
  
```

```

12:34:56          ***** NATURAL MAP EDITOR *****          10/31/04
                    - Array Table Definition -

Main   Index:  Vert. Occur.  12 Starting from #INDEX__  Spacing 0   Lines
Second Index:  Direction(H/V) H           _____         1   Cls/Ls
Third  Index:  Direction(H/V) V           _____         0   Cls/Ls
-----
Name of Variable      Col   Dimension Size   Order   2.Ind  3.Ind
(truncated)          Pos   Ind1  Ind2  Ind3   M S T   Occ.  Occ.
-----
#REG-NUM              4    256   1    1     1
#MAKE-MODEL          21    256   1    1     1
#COLOR-YEAR          43    256   1    1     1
#CLASS               59    256   1    1     1
#LEASED              69    256   1    1     1

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit      --   -   +                               Let
  
```

Type "12" in the Main Index: Vert. Occur. Parameter, type #INDEX in the Starting from parameter and press the ENTER key.

~ 17 ~ Array Processing

```

Ob P XXSVU                               Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM                                A15  .   T D   Blnk    T I   ?
2 #MAKE-MODEL                             A20  .   A D   _       A I   )
3 #COLOR-YEAR                             A14  .   A N   ^       M D   &
4 #CLASS                                  A8   .   M I   :       O D   +
5 #LEASED                                  A8   .   O I   (
6 #INDEX                                  I2   .
001  --010---+-----+-----+---030---+-----+-----+---050---+-----+-----+---070---+-----

      REGISTRATION          MAKE & MODEL          COLOR & YEAR          CLASS          LEASED

&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help Mset Exit Test Edit -- - + Full < > Let
  
```

Press PF8 to scroll to the bottom of the map in the Map Editor. The 011 on the far left of the scale line indicates line 11 is at the top of the working window. If you count down to the PF key lines you'll know you're at the bottom of the map (they are labeled and colored blue for demonstration only). Now add in the prompt and other messages from the template.

```

Ob P XXSVU                               Ob D CLS ATT DEL      CLS ATT DEL
1 #REG-NUM                                A15  .   T D   Blnk    T I   ?
2 #MAKE-MODEL                             A20  .   A D   _       A I   )
3 #COLOR-YEAR                             A14  .   A N   ^       M D   &
4 #CLASS                                  A8   .   M I   :       O D   +
5 #LEASED                                  A8   .   O I   (
6 #INDEX                                  I2   .
011  --010---+-----+-----+---030---+-----+-----+---050---+-----+-----+---070---+-----
11&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
12&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
13&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
14&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
15&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
16&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXX &XXXXXXXXXX
17
18
19
20
21
22
23
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help Mset Exit Test Edit -- - + Full < > Let
  
```

You'll have to scroll the Observation Window down a little.

~ 19 ~ Array Processing

```

Ob P XXSVU                               Ob D CLS ATT DEL CLS ATT DEL
1 #TABLE-COUNT                           I2 . T D Blnk T I ?
2 #COLOR-KEY                              A10 . A D _ A I )
. . . . .                               . A N ~ M D &
. . . . .                               . M I : O D +
. . . . .                               . O I ( .
011 --010---+---+---+---030---+---+---+---050---+---+---+---070---+---
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
New Color? _XXXXXXXXXXXX

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
Help Mset Exit Test Edit -- - + Full < > Let
  
```

Leave out the other fields since they were for testing only but do include the PF key settings as illustrated below:

```

Ob P XXSVU                               Ob D CLS ATT DEL CLS ATT DEL
1 #TABLE-COUNT                           I2 . T D Blnk T I ?
2 #COLOR-KEY                              A10 . A D _ A I )
. . . . .                               . A N ~ M D &
. . . . .                               . M I : O D +
. . . . .                               . O I ( .
011 --010---+---+---+---030---+---+---+---050---+---+---+---070---+---
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
&XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXXXXXXXXXX &XXXXXXXXXXXX &XXXXXXXXXXXX
New Color? _XXXXXXXXXXXX

PF3=QUIT PF10=BACK PF11=FORWARD

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
Help Mset Exit Test Edit -- - + Full < > Let
  
```

Position the cursor somewhere within the first occurrence of REG-NUM and press PF5. The Extended Field Edition window will appear; notice the ".E" on the first position of the field.

~ 21 ~ Array Processing

```

12:34:56          ***** NATURAL MAP EDITOR *****          10/31/04
User DDHAMIL          - Edit Map -          Library DDHAMIL

      Code      Function
      ----      -
      D      Field and Variable Definitions
      E      Edit Map
      I      Initialize new Map
      H      Initialize a new Help Map
      M      Maintenance of Profiles & Devices
      S      Save Map
      T      Test Map
      W      Stow Map
      ?      Help
      .      Exit

      Code .. W      Name .. XXSVV___      Profile .. SYSPROF_

Command ===>
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help      Exit Test Edit
Editing completed successfully.

```

Return to the Edit Map screen and STOW your map by typing a “W” in the Code parameter and press the ENTER key. There is a missing field and the Map Editor will invoke the Field and Variable Definitions – Summary screen illustrated below:

```

12:34:56          Field and Variable Definitions - Summary          10/31/04

Cmd Field Name (Truncated)          Mod Format Ar Ru Lin
Col
--- #REG-NUM          D      A15   A      5   4
--- #MAKE-MODEL      D      A20   A      5  21
--- #COLOR-YEAR      D      A14   A      5  43
--- #CLASS          D      A8    A      5  59
--- #LEASED          D      A8    A      5  69
+-----+-----+-----+-----+-----+-----+-----+-----+
| Cmd Name of Parameter (Truncated)          Format Ar |
| --- #INDEX          I2          |
| --- |
| --- |
| --- |
| --- |
| --- |
| --- |
| --- |
+-----+-----+-----+-----+-----+-----+-----+
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--
      Help  Mset  Exit          --          Parm  Local          Let

```

The Parameter Definition menu is used to define variables not defined in normal field layout.

~ 23 ~ Array Processing

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
30691951	FORD MERCURY	BLUE 82		PURCHASE
30692101	FIAT DINO	BLUE 84		PURCHASE
30692251	GENERAL MOTORS BUICK	BLUE 78		PURCHASE
30694201	FORD MERCURY	BLUE 86	PRIVATE	LEASED
30708217	FORD MERCURY	BLUE 82		PURCHASE
30709451	FIAT DINO	BLUE 84		PURCHASE
30710685	GENERAL MOTORS BUICK	BLUE 78		PURCHASE
30731075	FORD MERCURY	BLUE 86	PRIVATE	LEASED
30744355	TOYOTA CRESSIDA	BLUE 81	PRIVATE	LEASED
30810755	GENERAL MOTORS CHEVR	BLUE 77	PRIVATE	LEASED
30817865	JAGUAR E-TYPE	BLUE 80		PURCHASE
30821567	CHRYSLER PLYMOUTH	BLUE 83		PURCHASE
	New Color?			

PF3=QUIT PF10=BACK PF11=FORWARD

And here's the last page of the BLUE's:

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
C147 MAU	FORD SIERRA 1.6	BLUE 85		PURCHASE
BAA 285X	MORRIS MINOR 1000	BLUE 81		PURCHASE
CCH 375X	CITROEN CV2	BLUE 80		PURCHASE
D519 FNU	FORD ORION 1.6	BLUE 86		LEASED
RRT 443Y	VOLKSWAGEN GOLF	BLUE 82		PURCHASE
	** End of Data **			

New Color? _____

PF3=QUIT PF10=BACK PF11=FORWARD

Type "silver" in the New Color parameter and press the ENTER key.

~ 24 ~ Array Processing

```
REGISTRATION      MAKE & MODEL      COLOR & YEAR      CLASS      LEASED
A654 BUN          CITROEN PALLAS    SILVER 83          _____ PURCHASE
EAT 443X          DATSUN SUNNY      SILVER 81          _____ PURCHASE
_____          ** End of Data ** _____
```

New Color? _____

PF3=QUIT PF10=BACK PF11=FORWARD

Note: If you had decided to attach a separate CV to the #MAKE-MODEL array, then the following code would give you a different display:

```
*
AT END OF DATA
  MOVE #J TO #TOP-INDEX
  ADD 1 TO #J
  MOVE (AD=NP) TO #CLEAR(#J:256) /* clears everything after the DATSUN SUNNY
  MOVE '** End of Data **' TO #MAKE-MODEL(#J)
  ADD 1 TO #J
  MOVE (AD=NP) TO #CLEAR-MAKE-MODEL(#J:256) /* clears make-model column
END-ENDDATA
*
```

you would then see:

```
REGISTRATION      MAKE & MODEL      COLOR & YEAR      CLASS      LEASED
A654 BUN          CITROEN PALLAS    SILVER 83          _____ PURCHASE
EAT 443X          DATSUN SUNNY      SILVER 81          _____ PURCHASE
_____          ** End of Data ** _____
```

~ 25 ~ Array Processing

Page Counting

You can add some code that will give you a page count that increases or decreases depending on the PF keys depressed. The previous BLUE test will result in the screen shown below after adding the page counting code:

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
30691951	FORD MERCURY	BLUE 82		PURCHASE
30692101	FIAT DINO	BLUE 84		PURCHASE
30692251	GENERAL MOTORS BUICK	BLUE 78		PURCHASE
30694201	FORD MERCURY	BLUE 86	PRIVATE	LEASED
30708217	FORD MERCURY	BLUE 82		PURCHASE
30709451	FIAT DINO	BLUE 84		PURCHASE
30710685	GENERAL MOTORS BUICK	BLUE 78		PURCHASE
30731075	FORD MERCURY	BLUE 86	PRIVATE	LEASED
30744355	TOYOTA CRESSIDA	BLUE 81	PRIVATE	LEASED
30810755	GENERAL MOTORS CHEVR	BLUE 77	PRIVATE	LEASED
30817865	JAGUAR E-TYPE	BLUE 80		PURCHASE
30821567	CHRYSLER PLYMOUTH	BLUE 83		PURCHASE
	New Color?			

PAGE 1 OR 8 PAGES PF3=QUIT PF10=BACK PF11=FORWARD

First add these two new variables:

```
1 #PAGE          (I2)
1 #PAGES         (I2)
```

Insert the following FIND loop after the END-READ statement. This code establishes the value of the number of pages to be displayed. The DIVIDE is used to calculate the number of pages with 12 lines on each. The REMAINDER indicates a page with less than 12 pages so the total pages is bumped up by one.

```
END-READ
*
FIND VEHICLES WITH COLOR = #COLOR-KEY
  MOVE *NUMBER TO #PAGES
  DIVIDE 12 INTO #PAGES REMAINDER #PAGE
  IF #PAGE GT 0
    ADD 1 TO #PAGES
  END-IF
  MOVE 1 TO #PAGE
END-FIND
*
REPEAT
*
```

~ 26 ~ Array Processing

```
INPUT (AD=MI'_' CD=YE IP=OFF)
```

Here's an example of the code used to display the page counting variables:

```
17/28 'NEW COLOR?' (YE) #COLOR-KEY(AD=ADI'_' )
19/3 'PAGE' (YE) #PAGE (AD=O NL=3)
'OF' (YE) #PAGES 'PAGES' (YE)
'PF3=QUIT PF10=BACK PF11=FORWARD' (YE)
```

*

The new lines supporting page counting are displayed in red below:

```
IF *PF-KEY = 'PF11'
  ADD 12 TO #INDEX
  ADD 1 TO #PAGE
  IF #PAGE GT #PAGES
    #PAGE := #PAGES
  END-IF
IF #END-OF-DATA
  MOVE #END-INDEX TO #INDEX
  ESCAPE TOP
END-IF
IF #INDEX GT ((#TOP-INDEX / 12) * 12)
  COMPUTE #END-INDEX = #INDEX = ((#TOP-INDEX / 12) * 12) + 1
  MOVE TRUE TO #END-OF-DATA
END-IF
ESCAPE TOP
END-IF
*
IF *PF-KEY = 'PF10'
  SUBTRACT 12 FROM #INDEX
  SUBTRACT 1 FROM #PAGE
  MOVE FALSE TO #END-OF-DATA
  IF #INDEX LT 1
    MOVE 1 TO #INDEX
    MOVE 1 TO #PAGE
  END-IF
  ESCAPE TOP
END-IF
*
```

Now test this code by running the program and trying a few colors. Examples follow, one for the color GREEN, one for BLUE, and one for SILVER

~ 27 ~ Array Processing

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
30691501	GENERAL MOTORS CHEVR	GREEN 1977	PRIVATE	LEASED
30692551	FORD PINTO	GREEN 1977		PURCHASE
30704515	GENERAL MOTORS CHEVR	GREEN 1977	PRIVATE	LEASED
30714240	VOLVO DL	GREEN 1977		PURCHASE
30758869	CHRYSLER DODGE	GREEN 1979		PURCHASE
30793773	GENERAL MOTORS OLDSM	GREEN 1982		PURCHASE
30808287	PORSCHE 914	GREEN 1977		PURCHASE
30815397	GENERAL MOTORS CHEVR	GREEN 1980		PURCHASE
30828677	CHRYSLER DODGE	GREEN 1980		PURCHASE
30840723	GENERAL MOTORS CHEVR	GREEN 1981		PURCHASE
30890141	TOYOTA CRESSIDA	GREEN 1984		PURCHASE
30909591	FORD LINCOLN	GREEN 1986		PURCHASE

NEW COLOR? _____

PAGE 1 OF 4 PAGES PF3=QUIT PF10=BACK PF11=FORWARD

First page of GREEN vehicles. Press PF11 until the last page is displayed.

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
B47 XAU	FORD ESCORT 1.3	GREEN 1985		PURCHASE
TCH 709Y	MORRIS MARINA	GREEN 1981		PURCHASE
	** END OF DATA **			

NEW COLOR? _____

PAGE 4 OF 4 PAGES PF3=QUIT PF10=BACK PF11=FORWARD

~ 28 ~ Array Processing

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
30691951	FORD MERCURY	BLUE 1982		PURCHASE
30692101	FIAT DINO	BLUE 1984		PURCHASE
30692251	GENERAL MOTORS BUICK	BLUE 1978		PURCHASE
30694201	FORD MERCURY	BLUE 1986	PRIVATE	LEASED
30708217	FORD MERCURY	BLUE 1982		PURCHASE
30709451	FIAT DINO	BLUE 1984		PURCHASE
30710685	GENERAL MOTORS BUICK	BLUE 1978		PURCHASE
30731075	FORD MERCURY	BLUE 1986	PRIVATE	LEASED
30744355	TOYOTA CRESSIDA	BLUE 1981	PRIVATE	LEASED
30810755	GENERAL MOTORS CHEVR	BLUE 1977	PRIVATE	LEASED
30817865	JAGUAR E-TYPE	BLUE 1980		PURCHASE
30821567	CHRYSLER PLYMOUTH	BLUE 1983		PURCHASE

NEW COLOR? _____

PAGE 1 OF 8 PAGES PF3=QUIT PF10=BACK PF11=FORWARD

On the last page of the GREEN search, type BLUE in the NEW COLOR? Parameter and press the ENTER key. The first screen for the BLUE search is illustrated above; the last page below:

REGISTRATION	MAKE & MODEL	COLOR & YEAR	CLASS	LEASED
C147 MAU	FORD SIERRA 1.6	BLUE 1985		PURCHASE
BAA 285X	MORRIS MINOR 1000	BLUE 1981		PURCHASE
CCH 375X	CITROEN CV2	BLUE 1980		PURCHASE
D519 FNU	FORD ORION 1.6	BLUE 1986		LEASED
RRT 443Y	VOLKSWAGEN GOLF	BLUE 1982		PURCHASE

** END OF DATA **

NEW COLOR? _____

PAGE 8 OF 8 PAGES PF3=QUIT PF10=BACK PF11=FORWARD

~ 29 ~ Array Processing

Now type SILVER in NEW COLOR? And press the ENTER key. We picked SILVER to illustrate when less the 12 lines are returned.

```
REGISTRATION      MAKE & MODEL          COLOR & YEAR      CLASS      LEASED
A654 BUN          CITROEN PALLAS       SILVER 1983       PURCHASE
EAT 443X         DATSUN SUNNY         SILVER 1981       PURCHASE
** END OF DATA **
```

NEW COLOR? _____

PAGE 1 OF _____1 PAGES PF3=QUIT PF10=BACK PF11=FORWARD

In each of the samples of above, pressing PF11 another time after reaching the end of the search criteria does not change the display. Pressing PF10 will scroll backward but not beyond the first record; the page number will not fall below 1.

These examples were first developed using Natural v3 and tested again under Natural v4.1.

Any ideas or improvements to this code are welcome.

Send you suggestions or other ideas regarding these examples or other ideas you might have to:

whobooks@hotmail.com