--- D:\HTDOCS\DOCS\ANSYS.THEORY56\SPLIT ---

5:42 pm Monday, June 26, 2000

```
      ⎕ALX     ← ⎕DM
      ⎕CT      ← 1.0E¯13
      ⎕ELX     ← ⎕DM
      ⎕IO      ← 1
      ⎕LX      ← ''
      ⎕PP      ← 10
      ⎕PW      ← 72
      ⎕RL      ← 996497972
      ⎕SYMB      277 210
      ⎕WA        1523824
      ⎕WSSIZE    1572864
      Bytes used = 49040
```

FUNCTION LISTING:
(10 FUNCTIONS USING 22624 BYTES)

1516	FmtCharMat	8076	mkindex	3888	split_elem
1124	NTIE	220	print	168	table
464	RmRow	752	rts		
3592	elem_sort	2824	split_chap		

FmtCharMat

```
    ∇ mat←mat FmtCharMat cols;rows;even;⎕io
[1]   ⍝ Take a one word column matrix and convert it to <cols> number
[2]   ⍝ of words per row. Output <mat> is organized in newspaper format
[3]   ⍝ so that you read down the first column and then continue down the
[4]   ⍝ next column.
[5]   ⍝ Ouptut <mat> is a rows × cols nested array
[6]   ⍝
[7]   ⍝ David Edwards <dee.engineering@usa.net> Sat Jun 17 19:23:53 EDT 2000
[8]
[9]   ⎕io←1
[10]
[11]  ⍝ Number of words to make an even matrix of words: even=cols×rows
[12]  rows←⌈(⍴⍴mat)cols
[13]  even←cols×⌈(⍴⍴mat)cols
[14]
[15]  ⍝ This will enclose the words into 1 element/word and pad the
[16]  ⍝ end of the vector with blank elements as needed.
[17]  mat←⍉(cols,rows)⍴even↑⊂[2]mat
    ∇
```

NTIE

```
    ∇ TIE←NTIE PATH;⎕ELX;⎕IO
[1]   ⍝∇The path is tied. TIE[1] is the tie number.  TIE[2] is a (1) if the
[2]   ⍝∇file aleady exists, or (0) if it had to be created.
[3]   ⎕IO←1
[4]   ⎕ELX←'→TRAP'
[5]   TIE←¯1+⌊/0,⎕NNUMS
[6]   PATH ⎕NTIE TIE
[7]   TIE←TIE,1
[8]   →END
[9]
[10]  TRAP:
[11]  →CREATE×⍳⍬⍴⎕DM ⎕SS 'FILE NOT FOUND'
[12]  ⍎⎕ELX←'⎕ERROR ((⎕DM⍳⎕TCNL)-⎕IO)↑⎕DM' ⍝ Special error handling
[13]
[14]  CREATE:
[15]  ⎕ELX←'⎕ERROR ((⎕DM⍳⎕TCNL)-⎕IO)↑⎕DM' ⍝ Special error handling
[16]  PATH ⎕NCREATE TIE
[17]  TIE←TIE,0
```

```
[18]  END:
    ▽
```

RmRow

```
    ▽ m←m RmRow str;⎕io
[1]   ⍝ Remove row of char matrix <m> matching <str>
[2]   ⎕io←1
[3]
[4]   m←(~∧/((¯1↑⍴m)↑str)=[2]m)/[1]m
    ▽
```

elem_sort

```
    ▽ elem_sort;j;jsort;en0;name
[1]   ⍝ Read the matrix <elem_names> which contains a list of all the
[2]   ⍝ ANSYS element names in any order and write out the list in
[3]   ⍝ alphabetic, alphanumeric and in element number order.
[4]   ⍝ NOTE: All element names must use only upper case letters and digits.
[5]
[6]   ⍝ First do the purely alphabetic sort
[7]   elem_names_alpha←elem_names[(caps,'0123456789')⍋elem_names;]
[8]
[9]   ⍝ Next get the vector of element numbers
[10]  ⍝ Init vector w/ # rows in mat
[11]  elem_nums ← (1↑⍴elem_names_alpha)⍴0
[12]
[13]  ⍝ Init matrix with zero padded element numbers.
[14]  ⍝ The max potential width the matrix could be
[15]  ⍝ is the current width + 2 since all elem
[16]  ⍝ names have at least one digit (assuming
[17]  ⍝ 3 digits maximum)
[18]  en0←(elem_names,' '),' '
[19]
[20]  :for j :in  ⍳⍴elem_nums
[21]      ⍝ Remove all letters and convert to #
[22]      elem_nums[j]←⍋elem_names_alpha[j;]~caps
[23]
[24]      name←(elem_names_alpha[j;]~'0123456789 '),¯3↑'00',⍕elem_nums[j]
[25]      en0[j;]←(⍴en0[j;])↑name
[26]  :endfor
[27]
[28]  ⍝ Get the sort order and output the sorted matrix
[29]  jsort ← ⍋elem_nums
[30]  elem_names_numeric←elem_names_alpha[jsort;]
[31]
[32]
[33]
[34]  ⍝ Lastly, generate the alphanumeric matrix so that things like
[35]  ⍝ "BEAM3" comes before "BEAM161"
[36]
[37]  ⍝ Make a temp. list of all element names with 3 digit numbers
[38]  ⍝ padding with zeros as needed.
[39]
[40]  ⍝ ★★★ THIS COULD BE DONE BELOW W/O LOOPING - BUT,
[41]  ⍝ FOR NOW DO IT ABOVE - SEE <name>
[42]
[43]  ⍝ Next, sort the list with padded zeros and get the index order
[44]  ⍝ to use for sorting the elem_names.
[45]
[46]  elem_names_an←elem_names_alpha[(caps,'0123456789')⍋en0;]
    ▽
```

mkindex

```
    ▽ mkindex ;i;j;k;str;tie;ftie;fname;elem_names;⎕io
[1]
[2]   ⍝ Make the index.html files to go with the split up manual.
[3]   ⍝ Three files are created:
[4]   ⍝  1. index.html - TOC for all the cahpters
[5]   ⍝  2. chap14/index.html - TOC for Element library in alpha order.
[6]   ⍝  3. chap14/index.num.html - TOC for Elem. libary in numeric order.
[7]   ⍝
[8]   ⍝ Needs global vars <elem_names_alpha> and <elem_names_numeric>
[9]
[10]  ⎕io←1
```

```
[11]
[12]  ⍝ File names to create
[13]  fname←⊂'z:\sl\ansys.theory56\index.html'
[14]  fname←fname,⊂'z:\sl\ansys.theory56\chap14\index.html'
[15]  fname←fname,⊂'z:\sl\ansys.theory56\chap14\index.num.html'
[16]
[17]  ⍝ Create or open and truncate the three files.
[18]  ftie←3/0
[19]  :for j :in ⍳3
[20]      tie←NTIE ⊃fname[j]     ⍝ tie[1]=ntn,  tie[2]=0 is new file
[21]      :if tie[2] = 1
[22]          0 ⎕nresize 1↑tie   ⍝ Truncate the prexisting file
[23]      :endif
[24]      ftie[j]←tie[1]
[25]  :endfor
[26]
[27]
[28]  ⍝ Write head portion of all three files
[29]  :for tie :in ftie
[30]   print '<!doctype html public "-//w3c//dtd html 4.0 transitional//en">'
[31]   print '<html>'
[32]   print '<head>'
[33]   print '   <title>Ansys 5.6 Theory Manual</title>'
[34]   print '   <meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">'
[35]   print '   <meta name="Author" content="David Edwards <dee.engineering@usa.net>">'
[36]   print '   <meta name="GENERATOR" content="APL+Win 3.6">'
[37]   print '</head>'
[38]   print ''
[39]  :endfor
[40]
[41]  ⍝ Write body of main TOC index file.
[42]  tie←ftie[1]
[43]   print '<BODY BGCOLOR="#FFFFFF">'
[44]   print '<CENTER>'
[45]   print '<H1>Ansys 5.6 Theory Manual</H1>'
[46]   print '<HR align=center width=90% size=3>'
[47]   print 'Element Listing: <a href="chap14/index.html">Alphabetic Order</a> - '
[48]   print ' <a href="chap14/index.num.html">Numeric Order</a>'
[49]   print '<HR align=center width=90% size=3>'
[50]   print '<small>(<a href"theory56.pdf">Download entire theory manual</a>)</small>'
[51]   print '</CENTER>'
[52]   print '<p>'
[53]
[54]   print '<a href="theory56.title.pdf">Title, Disclaimer of Warranty and Liability</a><p>'
[55]   print '<a href="theory56.01.pdf">1  Introduction</a><p>'
[56]   print ''
[57]   print '<H2>The Phenomena</H2>'
[58]
[59]  :for j :in 2 3 4 5 6 7 8 9 10 11
[60]      print '<a href="theory56.',(¯2↑'0',⍕j),'.pdf">',(rts ChapterTitles[j;]),'</a><p>'
[61]  :endfor
[62]
[63]  print ''
[64]  print '<H2>The Elements</H2>'
[65]
[66]  :for j :in 12 13 14
[67]      print '<a href="theory56.',(⍕j),'.pdf">',(rts ChapterTitles[j;]),'</a><p>'
[68]  :endfor
[69]
[70]  print ''
[71]  print '<H2>The Solvers</H2>'
[72]
[73]  :for j :in 15 16 17
[74]      print '<a href="theory56.',(⍕j),'.pdf">',(rts ChapterTitles[j;]),'</a><p>'
[75]  :endfor
[76]
[77]  print ''
[78]  print '<H2>The Data Handlers</H2>'
[79]
[80]  :for j :in 18 19 20
[81]      print '<a href="theory56.',(⍕j),'.pdf">',(rts ChapterTitles[j;]),'</a><p>'
[82]  :endfor
[83]
[84]  print ''
[85]  print '<p>'
[86]  print '<a href="theory56.ref.pdf">References</a><p>'
[87]  print '<a href="theory56.index.pdf">Index</a>'
[88]
[89]  ⍝ Write body of TOC for the two Element library files.
```

```
[90]
[91]  i←⊃,elem_names_an FmtCharMat 5
[92]  j←⊃,elem_names_numeric FmtCharMat 5
[93]  elem_names←i ,[.1] j
[94]
[95]  :for i :in ⍳2
[96]      tie ← ftie[1+i]
[97]      print '<BODY BGCOLOR="#FFFFFF">'
[98]      print '<center>'
[99]      print '<H1>ANSYS 5.6 Theory Manual - Element Library</H1>'
[100]     print '<p>'
[101]     print ''
[102]     print '<center>'
[103]     print '<table cellspacing="5" width="80%">'
[104]
[105]     :for j :in ⍳30
[106]         print ''
[107]         print '<tr>'
[108]         :for k :in ⍳5
[109]             str←elem_names[i;k+5×j-1;]~' '
[110]             print '  <td><A HREF="',str,'.pdf">',str,'</A></td>'
[111]         :endfor
[112]         print '</tr>'
[113]     :endfor
[114]
[115]     print '</table>'
[116]     print '</center>'
[117] :endfor
[118]
[119] ⍝ Write tail section for all three files and close files.
[120] :for tie :in ftie
[121]     print ''
[122]     print '</body>'
[123]     print '</html>'
[124]     ⎕nuntie tie
[125] :endfor
[126]
[127]
[128] '  Wrote: ' ◇ 3 1⍴⊂fname
[129]
    ▽
```

print

```
    ▽ print str
[1]   ((,str),⎕tclf) ⎕nappend tie
    ▽
```

rts

```
    ▽ s←rts s
[1]   s←(⍵~∧\⍵=' ')/s
[2]   →0
[3]
[4]   ⍝ Remove Trailing Spaces
[5]   ⍝
[6]   ⍝ This function removes all spaces at the end of a
[7]   ⍝ character vector if there are any.
[8]   ⍝
[9]   ⍝ Example:
[10]  ⍝   rts '10 SOLID95      '
[11]  ⍝ returns:  '10 SOILD95'
    ▽
```

split_chap

```
    ▽ split_chap ;j;c;tie;cmd;fname
[1]   ⍝ Make shell script which when run will split "theory56.ps" into sections
[2]   ⍝ Needs global var <toc_chap> which gives the page numbers into the post-
[3]   ⍝ script file: "theory56.ps"
[4]
[5]   fname←'z:\sl\ansys.theory56\split-chap.sh'
[6]
[7]   tie←NTIE fname  ⍝ tie[1]=ntn,  tie[2]=0 is new file
[8]
[9]   :if tie[2] = 1
```

```
[10]      0 ⎕nresize 1↑tie          ⍝ Truncate the prexisting file
[11]  :endif
[12]
[13]  tie←1↑tie
[14]
[15]  print '#!/bin/sh'
[16]  print '#'
[17]  print '# Split the Ansys Theory Manual into individual chapters'
[18]  print '#'
[19]  print ''
[20]  print 'IN=theory56.ps'
[21]  print 'OUT=theory56'
[22]  print ''
[23]
[24]  cmd←'psselect -p'
[25]
[26]  print 'echo "title:"'
[27]  print cmd,(⍕toc_chap[1]),'-',(⍕toc_chap[2]-1),' $IN $OUT.title.ps'
[28]
[29]  ⍝ toc_chap is the page # for each chapter starting with 1 in theory56.ps
[30]  ⍝ j is the index into toc_chap
[31]  ⍝ c is the chapter number being selected out
[32]
[33]  :for j :in 1+⍳¯3+⍴toc_chap
[34]    c←j-1
[35]    print 'echo "Chapter ',(¯2↑'0',⍕c),':"'
[36]    print cmd,(⍕toc_chap[j]),'-',(⍕toc_chap[j+1]-1),' $IN $OUT.',(¯2↑'0',⍕c),'.ps'
[37]  :endfor
[38]
[39]  print 'echo "References:"'
[40]  print cmd,(⍕toc_chap[j+1]),'-',(⍕toc_chap[j+2]-1),' $IN $OUT.ref.ps'
[41]  print 'echo "Index:"'
[42]  print cmd,(⍕toc_chap[j+2]),'- $IN $OUT.index.ps'
[43]
[44]  ⎕nuntie tie
[45]
[46]  '  Wrote "',fname,'"'
    ∇
```

split_elem

```
    ∇ split_elem;tie;j;e;EN;C14;cmd;fname;⎕io
[1]   ⍝ Make shell script which when run will split "theory56.14.ps" into sections.
[2]   ⍝ Chapter 14 of the ANSYS theory manual is the "Element Library"
[3]
[4]   ⎕io←0                     ⍝ Use zero origin for section "14.0 Introduction"
[5]
[6]   fname←'z:\sl\ansys.theory56\split-elem.sh'
[7]
[8]   elem_sort                 ⍝ Create elem_names_numeric
[9]
[10]  EN  ← (8↑'intro'),[0]elem_names_numeric
[11]  EN ← EN RmRow 'SURF19'
[12]  EN ← EN RmRow 'SURF22'
[13]  EN ← EN RmRow 'FLUID66'
[14]
[15]  C14 ← chap14 ← 1,(offset14_1-offset14)+toc14
[16]  ps14 ← ¯1+offset14+chap14
[17]
[18]  tie←NTIE fname ⍝ tie[1]=ntn,  tie[2]=0 is new file, 1 otherwise
[19]
[20]  :if 1 = 1↓tie
[21]      0 ⎕nresize 1↑tie      ⍝ Truncate the prexisting file
[22]  :endif
[23]
[24]  tie←1↑tie
[25]
[26]  print '#!/bin/sh'
[27]  print '#'
[28]  print '# Split Ansys Theory Manual Chapter 14 into individual files'
[29]  print '#'
[30]  print ''
[31]  print 'IN=theory56.14.ps'
[32]  print 'OUT=chap14            # Output directory'
[33]  print ''
[34]  print 'if [ ! -d $OUT ]; then'
[35]  print ' mkdir $OUT'
[36]  print 'fi'
```

```
[37]  print ''
[38]
[39]  cmd←'psselect -p'
[40]
[41]  print 'echo "TOC:"'
[42]  print cmd,(⍕C14[0]),'-',(⍕C14[1]-1),' $IN $OUT/toc.ps'
[43]  C14←1↓C14
[44]
[45]  print 'echo "Intro:"'
[46]  print cmd,(⍕C14[0]),'-',(⍕C14[1]-1),' $IN $OUT/intro.ps'
[47]
[48]  ⍝ C14 is the page # for each element section starting with 1 in theory56.14.ps
[49]  ⍝ j is the index into chap14
[50]  ⍝ e is the element number (in char format) being selected out
[51]
[52]  :for j :in 1+⍳¯2+⍴C14
[53]    ⍝ e←¯3↑'00',EN[j;]~caps,' '  ⍝ Section #
[54]    print 'echo "',(EN[j;]~' '),':"'
[55]    print cmd,(⍕C14[j]),'-',(⍕C14[j+1]-1),' $IN $OUT/',(EN[j;]~' '),'.ps'
[56]  :endfor
[57]
[58]  j←j+1
[59]  ⍝ e←¯3↑'00',EN[j;]~caps,' '
[60]  print 'echo "',(EN[j;]~' '),':"'
[61]  print cmd,(⍕C14[j]),'- $IN $OUT/',(EN[j;]~' '),'.ps'
[62]
[63]  ⎕nuntie tie
[64]
[65]  '  Wrote "',fname,'"'
    ▽
```

table

```
    ▽ table
[1]   ⎕2 149⍴ps14,0,toc14
    ▽
```

```
VARIABLE LISTING:
(15 VARIABLES USING 16612 BYTES)

   908 ChapterTitles        1228 elem_names_numeric
  2672 README                624 elem_nums
  5424 a                      24 offset14
    52 caps                   24 offset14_1
   620 chap14                620 ps14
  1228 elem_names            616 toc14
  1228 elem_names_alpha      116 toc_chap
  1228 elem_names_an
```