Subject: Re: writing a structure with pointers Posted by davidf on Wed, 15 Jul 1998 07:00:00 GMT

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Lisa Bryan (Ibryan@arete-az.com) writes:

> Could someone tell me the easiest way to do the following.

>

> state = \{\text{.....big long huge structure with many substructures and lots}\)

>

- of pointers all over the place....}
- > writeu,unit,state

>

- I'm trying to write my state structure into an unformatted file and
- get the error:

>

- > WRITEU: Expression containing pointers not allowed in this context:
- > STATE.

Oh, oh. Looks like someone will have to write a recursive procedure to example the fields of structures and dereference the pointer fields. It is a shame there isn't a DEREFERENCE keyword that could be used with the WRITEU command.

The alternative, of course, is to SAVE the structure. SAVE will store the pointers along with the data they point to, so that all can be RESTORED later. This is not always my preferred solution, since it is not guaranteed to work with IDL upgrades and variables that are not named carefully can be a problem. I can imagine that pointer variables might be even more difficult to handle than normal variables.

Absent RSI adding some capability to WRITEU, how about you let us know when you have this program written, Lisa. :-)

Cheers,

David

David Fanning, Ph.D.

Fanning Software Consulting E-Mail: davidf@dfanning.com

Phone: 970-221-0438

Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: writing a structure with pointers Posted by davidf on Thu, 16 Jul 1998 07:00:00 GMT

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I wrote yesterday, responding to a question by Lisa Bryan:

- > The alternative, of course, is to SAVE the structure. SAVE
- > will store the pointers along with the data they point to, so
- > that all can be RESTORED later. This is not always my preferred
- > solution, since it is not guaranteed to work with IDL upgrades.

It has been pointed out to me by someone who certainly knows how this works that this is not accurate. RSI does not guarantee that *code* in IDL SAVE files (i.e., compiled procedures and functions) will be upwards compatible, but that *data* stored in such files will *always* be available in future upgrades.

Sorry for the confusion.

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting E-Mail: davidf@dfanning.com

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Subject: Re: writing a structure with pointers
Posted by IbryanNOSPAM on Thu, 16 Jul 1998 07:00:00 GMT
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On Wed, 15 Jul 1998 20:35:13 -0600, davidf@dfanning.com (David Fanning) wrote:

- > Lisa Bryan (Ibryan@arete-az.com) writes:
- > Could someone tell me the easiest way to do the following.
- >> state = {.....big long huge structure with many substructures and lots
- >> of pointers all over the place....}
- >> writeu,unit,state
- >>

> The alternative, of course, is to SAVE the structure. SAVE
> will store the pointers along with the data they point to, so
> that all can be RESTORED later. This is not always my preferred
> solution, since it is not guaranteed to work with IDL upgrades
> and variables that are not named carefully can be a problem.
> I can imagine that pointer variables might be even more

> difficult to handle than normal variables.

> Absent RSI adding some capability to WRITEU, how about you > let us know when you have this program written, Lisa. :-)

> > Cheers, >

> David

Thanks David and Martin,

I might use the save/restore option for the time being and save the recursive procedure for another day (Not that it didn't sound like a fun challenge!). Thanks for giving me a good direction. Since my most immediate desire is to be able to have a user of my GUI be able to revert the data entry fields to a given point in time, it looks like save/restore will do that (given the cautions that David mentioned). Am I correct in understanding that since I have no external information on the format of these files, they cannot be accessed except through the IDL RESTORE command nor ammended in any way?

Lisa

Arete Associates Tucson, Arizona

Subject: Re: writing a structure with pointers Posted by Martin Schultz on Thu, 16 Jul 1998 07:00:00 GMT View Forum Message <> Reply to Message

```
David Fanning wrote:
```

> Lisa Bryan (lbryan@arete-az.com) writes:
> Could someone tell me the easiest way to do the following.
>> state = {.....big long huge structure with many substructures and lots
>> of pointers all over the place....}

```
>> writeu,unit,state
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>> I'm trying to write my state structure into an unformatted file and
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>> WRITEU: Expression containing pointers not allowed in this context:
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> Oh, oh. Looks like someone will have to write a recursive
> procedure to example the fields of structures and dereference
> the pointer fields. It is a shame there isn't a DEREFERENCE
> keyword that could be used with the WRITEU command.
>
Hi Lisa, David,
```

David, didn't you yourself have this recursive program that extracts all structure tags on your webpage? I think, this could be a good starting point for a general routine to write structures with pointers and structures with pointers ...

But first, let's step back a little: I don't think there is an easy "generic" solution to this problem, because a pointer is only a long word, and you don't "know" the size of the stuff it points to off-hand. Hence, you can't simply de-reference all pointers and store the "real" data into a file, because you won't be able to read it again. So you actually have to come up with a proprietary file format that contains the tag names *and* the data/pointers you want to store (which is somewhat similar to what SAVE will do, except that you can have more control over it).

Now here is what I would do:

Start your file with some unique file type identifier (just a string of fixed length, e.g. BYTE('binary IDL structure file'), which makes it easier to analyze the file if you forgot what it is, and you try a more, vi, edit, etc.) Then write out the structure tagnames [fixed string length, i.e. BYTE() !(*)] recursively, thereby adding a type and size information (e.g. just print out the size array, although it would be easier to handle for input if you had a fixed length type information field, e.g. type [note that structures have 8, pointers have 10 when you adopt the "size" types], dim1, dim2, dim3,dim4 [should all be LONG!!]). Finally take a second recursive turn through the structure and write out all values, de-referencing your pointers on the fly.

(*) In a way that is going "back" to e.g. FORTRAN, where you have to deal with fixed string lengths, but the advantage is that you know the size of your "header", which makes it much easier to read. What I do to get a fixed length string is:

flstring = ([byte(str), replicate(32B,MAXLEN)])[0:MAXLEN-1]

When you read a structure back in, you may want to check out my CHKSTRU function (attached below), which allows you to test (a) whether a variable is a structure, and (b) whether it contains the tags that you need {does not operate recursively though}.

Hope, this helps a little, Martin. Dr. Martin Schultz Department for Earth&Planetary Sciences, Harvard University 109 Pierce Hall, 29 Oxford St., Cambridge, MA-02138, USA phone: (617)-496-8318 fax: (617)-495-4551 e-mail: mgs@io.harvard.edu Internet-homepage: http://www-as.harvard.edu/people/staff/mgs/ -----;+ NAME: CHKSTRU (function) PURPOSE: check validity of a structure and test if necessary fields are contained CATEGORY: tools CALLING SEQUENCE: res=CHKSTRU(STRUCTURE,FIELDS [,/VERBOSE]) INPUTS: STRUCTURE --> the structure to be tested. If STRUCTURE is not of type structure, the function will return 0 FIELDS --> a string or string array with field names to be contained in STRUCTURE. CHKSTRU returns 1 (true) only if all field names are contained in STRUCTURE. The entries of FIELDS may be upper or lowercase.

INDEX --> a named variable that will contain the indices of

KEYWORD PARAMETERS:

the required field names in the structure. They can then be assessed through structure.(index(i)) . Index will contain -1 for all fields entries that are not in the structure.

/VERBOSE --> set this keyword to return an error message in case of an error.

OUTPUTS:

CHKSTRU returns 1 if successful, otherwise 0.

SUBROUTINES:

REQUIREMENTS:

NOTES:

EXAMPLE:

test = $\{ a:1, b:2, c:3 \}$ required = ['a','c']

if CHKSTRU(test,required) then print, 'found a and c.'

MODIFICATION HISTORY:

mgs, 02 Mar 1998: VERSION 1.00

mgs, 07 Apr 1998: - second parameter (FIELDS) now optional

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function chkstru, structure, fields, index=index, verbose=verbose

```
: default index
index = -1
; first check number of parameters (must be at least 1)
if (n params() lt 1) then begin
  if(keyword set(verbose)) then $
```

```
print, 'CHKSTRU: ** invalid number of parameters! **'
        return,0
      endif
   ; check if the user really passed a structure
   s = size(structure)
   if (s(1+s(0))) ne 8) then begin
      if(keyword set(verbose)) then $
        print, 'CHKSTRU: ** No structure passed! **'
      return,0
   endif
   ; only one parameter: then we are finished
   if (n_params() eq 1) then return,1
   ; see if required field names are contained in the structure
   ; and return indices of these fields
   names = tag_names(structure)
   index = intarr(n_elements(fields)) - 1 ; default index to 'not found'
   for i=0,n_elements(fields)-1 do begin
     ind = where(names eq strupcase(fields(i)))
     if (ind(0) It 0) then begin
        if(keyword_set(verbose)) then $
          print, 'CHKSTRU: ** Cannot find field '+fields(i)+'! **'
      endif else index(i) = ind(0)
   endfor
   ; check minimum value of index field: -1 indicates error
   return, (min(index) ge 0)
end
File Attachments
1) chkstru.pro, downloaded 90 times
```