

Subject: Re: indexing over structure tags
Posted by [Paul van Delst](#) on Thu, 19 Apr 2001 17:00:20 GMT
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Randall Skelton wrote:

```
> Hello,  
>  
> Imagine someone has a structure of structures...  
>  
> ; define the basic structure for each  
> sm_struc = {basic_struct, comment: '', values: fltarr(nlev)}  
>  
> ; define the large structure  
> data = {big_struct, so4: sm_struc, co2: sm_struc, hcl: sm_struc}  
>  
> The IDL manual describes how to make an array of the tags in a structure  
> using:  
>  
> ; get the names of the tags  
> names = tag_names(data)  
>  
> so that names = [so4, co2, hcl].  
>  
> That is all fine. But is it possible to index over the tag names with a  
> for-loop?  
>  
> i.e. for i=0, n_elements(names)-1 do data.names[i].values = i  
> ^~~~~~
```

Maybe

data.names[i].(j) where j=0->N_TAGS(data.names[i])-1 ??

This works on "single-level" structures but I don't see why it wouldn't work on nested ones.

paulv

--
Paul van Delst A little learning is a dangerous thing;
CIMSS @ NOAA/NCEP Drink deep, or taste not the Pierian spring;
Ph: (301)763-8000 x7274 There shallow draughts intoxicate the brain,
Fax:(301)763-8545 And drinking largely sobers us again.
paul.vandelst@noaa.gov Alexander Pope.

Subject: Re: indexing over structure tags

Posted by [Paul van Delst](#) on Thu, 19 Apr 2001 17:05:43 GMT

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Paul van Delst wrote:

```
>
> Randall Skelton wrote:
>>
>> Hello,
>>
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>>
>> ; define the basic structure for each
>> sm_struc = {basic_struct, comment: ' ', values: fltarr(nlev)}
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>>                                ~~~~~
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> Maybe
>
> data.names[i].(j) where j=0->N_TAGS(data.names[i])-1 ???
>
> This works on "single-level" structures but I don't see why it wouldn't work on nested
> ones.
```

Oops, I guess you really wanted something like

data.(i).values

where i=0->number of molecular names

'Scusi

paulv

--
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paul.vandelst@noaa.gov Alexander Pope.

Subject: Re: indexing over structure tags
Posted by [tam](#) on Thu, 19 Apr 2001 17:16:38 GMT

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Just use the numeric tag syntax for structures.

```
for i=0,n_tags(data)-1 do begin
    data.(i).values = .. some expresion ...
endfor
```

where the (i) indicates use the i'th element of the structure.
So you don't need to use the names at all.

Regards,
Tom McGlynn

Randall Skelton wrote:

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>
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> for-loop?
>
> i.e. for i=0, n_elements(names)-1 do data.names[i].values = i
```

> ~~~~~
>
> where IDL determines what the appropriate label 'data.name[i].values' is.
>
> Thanks,
> Randall

Subject: Re: indexing over structure tags
Posted by [Randall Skelton](#) on Thu, 19 Apr 2001 17:24:09 GMT
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Thanks Tom... I did think of that. However, in this particular case there is some merit in having the name of the structure be a useful and human readable tag. Nobody would be happy trying to remember yet another arbitrary numbering scheme for molecules when they'd rather just type the name ;) My suspicion is that there isn't an easy way to do what I want...

Randall

On Thu, 19 Apr 2001, tam wrote:

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>
> for i=0,n_tags(data)-1 do begin
> data.(i).values = .. some expresion ...
> endfor
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> where the (i) indicates use the i'th element of the structure.
> So you don't need to use the names at all.
>
> Regards,
> Tom McGlynn
>

Subject: Re: indexing over structure tags
Posted by [Vapuser](#) on Thu, 19 Apr 2001 17:36:59 GMT
[View Forum Message](#) <> [Reply to Message](#)

Randall Skelton <rhskelet@atm.ox.ac.uk> writes:

> Hello,
>
> Imagine someone has a structure of structures...
>
> ; define the basic structure for each

```

> sm_struct = {basic_struct, comment: ' ', values: fltarr(nlev)}
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> for-loop?
>
> i.e. for i=0, n_elements(names)-1 do data.names[i].values = i
>                                ^^^^^^^^^^^^^^^^^^
>
> where IDL determines what the appropriate label 'data.name[i].values' is.
>
> Thanks,
> Randall
>
```

data.(i) to iterate over that tags of data, and
 data.(i).(j) to iterate over the tags of data.(i)

If each tag is an array, rather than a scalar structure instance, you
 might (probably?) have to pull it out, like this

```

IDL> junk={foo, a:0, b:0l, c:0.0}
IDL> bar={bar, a:replicate({foo},3),b:replicate({foo},4)}
IDL> help,bar,/struct
** Structure BAR, 2 tags, length=84:
A      STRUCT  -> FOO Array[3]
B      STRUCT  -> FOO Array[4]
```

```

IDL> .run
- FOR i=0,1 DO BEGIN
-   FOR j=0,2 DO BEGIN
-     tmp=bar.(i).(j) ;<--- I couldn't find a way to do this inline,
;           ; but there might be one that I'm missing
-     FOR k=0,n_elements(tmp)-1 DO tmp[k]=(2^(i+1))*(3^(j+1))+k
-     bar.(i).(j)=tmp
-   endfor
```

```
- endfor
- end
% Compiled module: $MAIN$.
IDL> print,bar
{
  a = {      6      18    54.0000}
    {      7      19    55.0000}
    {      8      20    56.0000}

  b = {     12      36   108.000}
    {     13      37   109.000}
    {     14      38   110.000}
    {     15      39   111.000}

}
```

whd

--
William Daffer: 818-354-0161: William.Daffer@jpl.nasa.gov

Subject: Re: indexing over structure tags
Posted by [Bernard Puc](#) on Thu, 19 Apr 2001 17:50:15 GMT
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Randall Skelton wrote:

>
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> is some merit in having the name of the structure be a useful and human
> readable tag. Nobody would be happy trying to remember yet another
> arbitrary numbering scheme for molecules when they'd rather just type the
> name ;) My suspicion is that there isn't an easy way to do what I want...
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>>
>> for i=0,n_tags(data)-1 do begin
>> data.(i).values = .. some expresion ...
>> endfor
>>
>> where the (i) indicates use the i'th element of the structure.
>> So you don't need to use the names at all.
>>

>> Regards,
>> Tom McGlynn
>>

Perhaps you misunderstood...there are two ways of accessing a tag within a structure.

data = {lat:fltarr(10), lng:fltarr(10), sig:fltarr(10)}

Method 1:

data.lat
data.lng
data.sig

Method 2:

data.(0)
data.(1)
data.(2)

Either method accesses the same variables.

--
Bernard Puc AETC, INC.
bpuc@va.aetc.com 1225 Jefferson Davis Highway #800
(703) 413-0500 Arlington, VA 22202

Subject: Re: indexing over structure tags
Posted by [Paul van Delst](#) on Thu, 19 Apr 2001 18:08:29 GMT

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Randall Skelton wrote:

>
> Thanks Tom... I did think of that. However, in this particular case there
> is some merit in having the name of the structure be a useful and human
> readable tag. Nobody would be happy trying to remember yet another
> arbitrary numbering scheme for molecules when they'd rather just type the
> name ;) My suspicion is that there isn't an easy way to do what I want...

Maybe more context is needed to solve your problem the user of the code *shouldn't* have to remember the (not so) arbitrary numbering scheme - the user would type in a molecule name (or names). How your code deals with searching the human readable tagnames is a different matter, no?

e.g.

; define the basic structure for each

```
sm_struct = {basic_struct, comment: '', values: fltarr(nlev)}  
  
; define the large structure  
data = {big_struct, so4: sm_struct, co2: sm_struct, hcl: sm_struct}  
  
; get the names of the tags  
names = taq_names(data)
```

so that names = [so4, co2, hcl].

Say the user requests data for 'so4' and 'hcl' so how about

```
user_request = ['so4', 'hcl']
n_requests = N ELEMENTS( user_request )
```

```
FOR i = 0, n_requests - 1 DO BEGIN
    tag_number = (WHERE( user_request[i] EQ names ))[0] ; <-- assume this always succeeds
    data_to_get = data.(tag_number).values
    IF ( i EQ 0 ) THEN $
        data_to_return = data_to_get $
    ELSE $
        data_to_return = [ [ data_to_return ], [ data_to_get ] ]
    ENDFOR

    RETURN data_to_return
```

or something like that? As it is above might not work for plucking out structures, but that's a detail. So is the concatenation build of the `data_to_return`. Should be o.k. for small arrays tho'.

pauly

--
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Subject: Re: indexing over structure tags
Posted by tam on Thu, 19 Apr 2001 19:23:50 GMT
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Hmmm.... Well assuming that you want to iterate (for whatever reason) over a set of names rather than a set of indices how about.

```
names = tagnames(data)
for i=0,n_tags(data)-1 do begin ; Or any other kind of loop
    name = ... entered somehow by the user perhaps ...
    w=where(name eq names[i]);
    if (w(0) ne -1) then begin
        ind = w[0]
        data.(ind).values = ...
....
```

It's easy enough to translate from the variable name to the variable index -- and the index may itself be a variable.

Tom

Randall Skelton wrote:

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Subject: Re: indexing over structure tags
Posted by [tam](#) on Thu, 19 Apr 2001 19:25:38 GMT
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tam wrote:

```
>
...
>     if (w(0) ne -1) then begin
```

```
>     ind = w[0]
>     data.(ind).values = ...
> ....
>
```

Mea culpa for the w(0) followed on the next line by w[0]. Just trying to induce maximal confusion.

Tom

Subject: Re: indexing over structure tags
Posted by [R.Bauer](#) on Tue, 24 Apr 2001 07:45:13 GMT
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Randall Skelton wrote:

```
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> Thanks Tom... I did think of that. However, in this particular case there
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> arbitrary numbering scheme for molecules when they'd rather just type the
> name ;) My suspicion is that there isn't an easy way to do what I want...
>
> Randall
>
```

Dear Randall,

I will show you an easy way, how to access any level of a structure by incrementing of a an array.

may be we have a structure like

```
pi={name:'p.mustermann'}
global={pi:pi}
n2o={param:fltarr(10),short_name:'N2O',long_name:'mixing
ratio',units:'ppb',flag:'NONE'}
time={param:fltarr(10),short_name:'time',long_name:'time
[UT]',units:'seconds since 2000-01-01 00:00:00 UTC', flag:'NONE'}
icgs={!global:global,time:time,n2o:n2o}
```

more attribute of this data structure are explained by my publication.
<http://www.fz-juelich.de/zb/text/publikation/juel3786.html>

The following routine creates an array of tagnames and an

array of pointers of any submitted structure
The return value of this function is n_elements(names)
and the keywords names and ptr_values

```
n=struct2names_and_ptrs(icgs,names=names,ptr_values=ptr_values)
PRINT,n
IDL> 11

IDL> PRINT,names
!GLOBAL.PI.NAME TIME.PARAM TIME.SHORT_NAME TIME.LONG_NAME TIME.UNITS
TIME.FLAG
N2O.PARAM N2O.SHORT_NAME N2O.LONG_NAME N2O.UNITS N2O.FLAG

IDL> FOR I=0,n-1 do help,*(ptr_values[i])
<PtrHeapVar1> STRING = 'p.mustermann'
<PtrHeapVar2> FLOAT = Array[10]
<PtrHeapVar3> STRING = 'time'
<PtrHeapVar4> STRING = 'time [UT]'
<PtrHeapVar5> STRING = 'seconds since 2000-01-01 00:00:00 UTC'
<PtrHeapVar6> STRING = 'NONE'
<PtrHeapVar7> FLOAT = Array[10]
<PtrHeapVar8> STRING = 'N2O'
<PtrHeapVar9> STRING = 'mixing ratio'
<PtrHeapVar10> STRING = 'ppb'
<PtrHeapVar11> STRING = 'NONE'
```

http://www.fz-juelich.de/icg/icg1/idl_icglib/idl_source/idl_html/dbase/download/struct2names_and_ptrs.tar.gz

This routine was written to use by add_tag, delete_tag, replace_tagvalue
and rename_tag
on each level of a structure with the following routine you are able to
build any structure defined from names and ptr_values.

http://www.fz-juelich.de/icg/icg1/idl_icglib/idl_source/idl_html/dbase/download/names_and_ptr2struct.tar.gz

For further routines and licensing please look at
http://www.fz-juelich.de/icg/icg1/idl_icglib/idl_lib_intro.html

Is this the solution of your problem?

Reimar

--

Reimar Bauer

Institut fuer Stratosphaerische Chemie (ICG-1)
Forschungszentrum Juelich

email: R.Bauer@fz-juelich.de
<http://www.fz-juelich.de/icg/icg1/>

=====

a IDL library at ForschungsZentrum Jülich
http://www.fz-juelich.de/icg/icg1/idl_icglib/idl_lib_intro.html

<http://www.fz-juelich.de/zb/text/publikation/juel3786.html>
