Subject: Re: How to get numbers into passed structure elements (pass-by-value/reference problem).
Posted by Wox on Thu, 28 Feb 2008 10:22:34 GMT
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On Wed, 27 Feb 2008 10:02:46 -0500, Paul van Delst
<Paul.vanDelst@noaa.gov> wrote:

```
> FUNCTION CRTM_Read_Atmosphere_Record, FileID     , $  ; Input
>                                Atm        , $  ; Output
>                                DEBUG=Debug     ; Optional input
>    .....
>    FOR n = 0, Atm.n_Clouds-1 DO BEGIN
>      result = CRTM_Read_Cloud_Record( FileID, (*Atm.Cloud)[n], DEBUG=Debug )
>      ...check result....
>    ENDFOR
```

So Atm.Cloud is a pointer to an array of structures. What if Atm.Cloud would be a pointer to an array of pointers (each pointing to one structure)? Than you could pass *(*Atm.Cloud)[n]

However, you would loose the ability to do something like this: (*Atm.Cloud).Type to get all types of clouds.

Subject: Re: How to get numbers into passed structure elements (pass-by-value/reference problem).
Posted by Paul Van Delst[1] on Thu, 28 Feb 2008 15:00:36 GMT
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Wox wrote:

```
>  On Wed, 27 Feb 2008 10:02:46 -0500, Paul van Delst
>  <Paul.vanDelst@noaa.gov> wrote:
>
>
>>  FUNCTION CRTM_Read_Atmosphere_Record, FileID     , $  ; Input
>>                                 Atm        , $  ; Output
>>                                 DEBUG=Debug     ; Optional input
>>    .....
>>    FOR n = 0, Atm.n_Clouds-1 DO BEGIN
>>      result = CRTM_Read_Cloud_Record( FileID, (*Atm.Cloud)[n], DEBUG=Debug )
>>      ...check result....
>>    ENDFOR
>
>  So Atm.Cloud is a pointer to an array of structures. What if Atm.Cloud
>  would be a pointer to an array of pointers (each pointing to one
>  structure)? Than you could pass *(*Atm.Cloud)[n]
```

Hello,

Yes, I could do that. I went with the "passing the entire array" approach (less pointers).

My goal was to replicate the functionality of my Fortran95 code: each little function works just on a single structure. The "main" routine can pass in a scalar or rank-1 array of the structures (I overloaded these such that the rank-1 form simply loops over the elements and calls the scalar function).

It may sound complicated, but in execution it's quite simple and allows for easy unit testing of the individual functions.

The complication with doing that in IDL is that when the actual argument to a function is
  (*Atm.Cloud)[n]
and the dummmy argument is simply
  Cloud
then this is sort-of (pointer components notwithstanding) equivalent to a "intent(in)" attribute in Fortran95, i.e. you can pass it in, but you cannot modify the dummy argument in the function.

This can be gotten around a number of ways in IDL (e.g. passing in all the elements, *Atm.Cloud; or making it a pointer as you suggested) but the added complexity makes the code harder to read and test. In a case like this where the structure components are a mixture of pointer and "regular" variables, it certainly isn't intuitive. Well, it's not to me, at least. :o)

I'll repeat my comment in my reply to David Fanning's post in this thread:
  I find it a fundamental flaw of IDL that the argument passing mechanism (reference or value) is so exposed to the user that they have to tailor their code to prevent data loss.

cheers,

paulv

> However, you would loose the ability to do something like this:
> (*Atm.Cloud).Type to get all types of clouds.
>
>

Subject: Re: How to get numbers into passed structure elements (pass-by-value/reference problem).
Posted by David Fanning on Thu, 28 Feb 2008 15:07:01 GMT

Paul van Delst writes:

> I'll repeat my comment in my reply to David Fanning's post in this thread:
> I find it a fundamental flaw of IDL that the argument passing mechanism (reference
> or value) is so exposed to the user that they have to tailor their code to prevent
> data loss.

I find this equivalent to dynamic tying and structuring:
powerful, but dangerous. Like keeping a loaded 357 Magnum
in the drawer of the night stand. In the right hands ... etc.

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: How to get numbers into passed structure elements (pass-by-value/reference problem).
Posted by David Fanning on Thu, 28 Feb 2008 15:11:08 GMT

David Fanning writes:

> I find this equivalent to dynamic tying and structuring:

Whoops, should be "typing", of course.

Cheers,

David

--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Sepore ma de ni thui. ("Perhaps thou speakest truth.")
