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Subject: Re: dynamic memory allocation

Posted by [Mark Hadfield](#) on Mon, 06 Dec 2004 02:16:47 GMT

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Francois wrote:

> Hello,  
>  
> How to dynamically allow memory for an array ?  
> For example, to declare a 2D array of 30 columns by 40 lines, you type  
> this code:  
> a = intarr(30,40)  
>  
> But if you don't know, before compilation, the number of dimensions of  
> the array, how do we do this ?  
>  
> Thank you,  
>  
> François.

In IDL, variables are created at run time and do not need to be "declared" beforehand. Consider the following code

```
pro test
  a = dist(30,40)
  surface, a
  a = 'My string'
  print, a
end
```

The first line of the procedure creates a floating point array dimensioned (30,40) and associates the variable name "a" with it. (The dimensions in this example are known at compile time, but they do not need to be.) The second line plots it as a surface plot. The third line creates a string and associates the name "a" with it. (The array created in line 1 is no longer accessible to IDL and the memory associated with it may--or may not--be returned to the operating system.) The fourth line prints the string to the console.

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Subject: Re: dynamic memory allocation

Posted by [enod](#) on Mon, 06 Dec 2004 15:27:01 GMT

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I think make\_array should be useful.

Tian

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Subject: Re: dynamic memory allocation  
Posted by [enod](#) on Mon, 06 Dec 2004 15:27:55 GMT  
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I think make\_array should be useful.

Tian

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Subject: Re: dynamic memory allocation  
Posted by [Marc Reinig](#) on Mon, 06 Dec 2004 18:08:03 GMT  
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"Mark Hadfield" <m.hadfield@niwa.co.nz> wrote in message  
news:cp0fej\$1r\$1@newsreader.mailgate.org...  
> In IDL, variables are created at run time and do not need to be "declared"  
> beforehand. Consider the following code  
>  
> pro test  
> a = dist(30,40)  
> surface, a  
> a = 'My string'  
> print, a  
> end  
>  
> The first line of the procedure creates a floating point array dimensioned  
> (30,40) and associates the variable name "a" with it. (The dimensions in  
> this example are known at compile time, but they do not need to be.) The  
> second line plots it as a surface plot. The third line creates a string  
> and associates the name "a" with it. (The array created in line 1 is no  
> longer accessible to IDL and the memory associated with it may--or may  
> not--be returned to the operating system.) The fourth line prints the  
> string to the console.

When would it be returned to the OS? Clearly (I hope) when IDL was shut down. How about when a break occurs? It would seem that a program could inadvertently eat up much of the available memory this way.

Does IDL have a background process that eventually free's memory that is no longer associated with variables?

How would I manually free the memory or tell IDL to?

Marco

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Marc Reinig  
UCO/Lick Observatory  
Laboratory for Adaptive Optics

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Subject: Re: dynamic memory allocation  
Posted by [Mark Hadfield](#) on Mon, 06 Dec 2004 20:50:03 GMT  
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Marc Reinig wrote:

> "Mark Hadfield" <m.hadfield@niwa.co.nz> wrote in message  
> news:cp0fej\$j1r\$1@newsreader.mailgate.org...  
>  
>> ...(The array created in line 1 is no  
>> longer accessible to IDL and the memory associated with it may--or may  
>> not--be returned to the operating system.)  
>  
> When would it be returned to the OS? Clearly (I hope) when IDL was shut  
> down. How about when a break occurs? It would seem that a program could  
> inadvertently eat up much of the available memory this way.  
>  
> Does IDL have a background process that eventually free's memory that is no  
> longer associated with variables?  
>  
> How would I manually free the memory or tell IDL to?

The details of IDL's memory management depend on the platform. There have been threads about this over the years on this newsgroup. As I understand it, IDL allocates and frees memory via calls to the C functions "malloc" and "free". What these functions do is up to the run-time library. I believe that on some platforms (in the past, if not now) memory released by "free" was not actually available to other processes until IDL exited.

I can report that on Windows 2000, allocation and freeing of memory seems to occur quickly. Eg, if I enter the following at a command prompt:

```
IDL> a = fltarr(1000000000)
```

the VM Size for "idlde.exe" reported by Windows Task Manager goes from 10,164 kiB to 401,176 kiB within a second or two. If I then type

```
IDL> a = 0
```

it goes back to 10,164 kiB.

In the case of ordinary variables, there is no need for a "background process" to manage memory. It is straightforward to determine which blocks of data are being used and which are not, and this is presumably done by the IDL interpreter after every statement is executed (or perhaps somewhat less often). Heap variables (pointers and objects) are more difficult as there can be more than one reference to each variable. IDL *could* implement an automatic "garbage collector" that frequently monitors the status of the heap variables to determine when they can be discarded. (Many other languages--eg Java, Python, Matlab--do this.) But IDL leaves this for the programmer to do, with the tools OBJ\_DESTROY, PTR\_FREE, HEAP\_GC and HEAP\_FREE.

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