
Subject: Re: Freeing memory

Posted by [Christian Soeller](#) on Fri, 13 Sep 1996 07:00:00 GMT

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Phil Williams <williams@irc.chmcc.org> writes:

> My question is why? And why is there very little discrepancy in the
> help,/mem for the heap used? The sysmon looks like alot more than a 1%
> difference?

It is because of the way that memory allocation in a process under unix works.
Following example, from an freshly started idl process:

```
IDL> i=fltarr(1000000)
```

```
IDL> help,/mem
```

```
heap memory in use: 4075014, calls to MALLOC: 138, FREE: 36
```

ps -el for the process:

```
30 S 1115 21705 21701 0 26 20 * 3070:1673 8838e3e0 pts/0 0:01 idl
```

i.e. Unix tells you that the process uses 3070 blocks of memory (1673 in
physical RAM)

But then say in IDL

```
IDL> i=0
```

```
IDL> help,/mem
```

```
heap memory in use: 74976, calls to MALLOC: 140, FREE: 37
```

Now ps -el tells you

```
30 S 1115 21705 21701 0 26 20 * 3070:1676 8838e3e0 pts/0 0:01 idl
```

i.e. still the same amount of memory is used by the process, even more is now
in physical RAM.

The paradox is resolved by knowing that memory that has been returned by IDL
(internally using some equivalent of the free (3C) function from the
allocation library) is not(!) being returned to the operating system but
merely put in the list of free blocks maintained by the allocation library
routines. Here is what the info of the GNU allocation library tells you:

> Occasionally, free can actually return memory to the operating system
> and make the process smaller. Usually, all it can do is allow a later
> later call to malloc to reuse the space. In the meantime, the space
> remains in your program as part of a free-list used internally by
> malloc.

So, if you have a temporary computation that uses a *huge* amount of memory
you will still see that in sysmon after the associated memory has been
internally freed and the heap memory in IDL looks much smaller. Another
related issue is memory fragmentation...

Obviously, if you restart the process from scratch and restore only the saved variables you won't incur these costs.

Regards,

Christian

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