
Subject: Re: "% Unable to allocate memory" when using histogram.

Posted by [Lajos Foldy](#) on Tue, 20 Oct 2015 15:45:23 GMT

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On Tuesday, October 20, 2015 at 5:19:04 PM UTC+2, Paul van Delst wrote:

```
> Hello,
>
> I have a utility that plots histograms of satellite data. I mention this
> because satellites==lots-of-data. (Although in this case, not so much)
>
> After reading in all the data I see the following:
>
> IDL> help, boxcar_obs, srf_obs
> BOXCAR_OBS      STRUCT  = -> <Anonymous> Array[10600]
> SRF_OBS        STRUCT  = -> <Anonymous> Array[10600]
>
> Each element of the structure looks like:
>
> IDL> help, BOXCAR_OBS[0]
> ** Structure <5424ac18>, 18 tags, length=1936, data length=1936, refs=2:
>  OBS          FLOAT   Array[22]
>  DEPAR_BC     FLOAT   Array[22]
>  DEPAR_NBC    FLOAT   Array[22]
>  ...etc...
>  BIAS_SCANANGLE_TERMS
>                FLOAT   Array[22, 5]
>  BIAS_SST_TERM FLOAT   Array[22]
>
> So, 18 tags of 22 element arrays of floats, except for the [22,5] array.
>
> I calculate this to be
> 4 * 22 * 22 = 1936 bytes
> just as reported above.
>
> So, there are 10600 of these, and two sets of data. Thus
>
> 1936 * 10600 * 2 = 41MB
>
> No worries, right? The memory report looks similar:
>
> IDL> memory(/structure)
> {
>   CURRENT: 47076590,
>   NUM_ALLOC: 14800356,
>   NUM_FREE: 14798590,
>   HIGHWATER: 47076645
> }
```

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> with 47MB reported.
>
> For testing, I then did the following:
>
>   n = 100
>   boxcar_obs = boxcar_obs[0:n]
>   srf_obs = srf_obs[0:n]
>   memory(/structure)
>
> and I got:
>
> {
>   CURRENT: 3904579,
>   NUM_ALLOC: 16682008,
>   NUM_FREE: 16680242,
>   HIGHWATER: 47271996
> }
>
> Again, no worries. Makes sense, yeah?
>
> Then, as I loop over each of the 22 channels I call the histogramming
> utility, ala:
>
>   for i = 0, nchan-1 do begin
>
>     gsi_radstat_histogram, $
>       boxcar_obs, $
>       obsdata2 = srf_obs, $
>       channel_index=i
>
>   endfor
>
> I added memory output right before the histogram function is called. And
> I get:
>
> channel 1
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      3910048
>   NUM_ALLOC     LONG      21910192
>   NUM_FREE      LONG      21908421
>   HIGHWATER     LONG      3929559
>
> channel 2
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      7176461
>   NUM_ALLOC     LONG      22116633
>   NUM_FREE      LONG      22110660
>   HIGHWATER     LONG      7185333

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>
> channel 3
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      7176461
>   NUM_ALLOC     LONG      22296048
>   NUM_FREE      LONG      22290075
>   HIGHWATER     LONG      7185333
> % Unable to allocate memory: to make array.
>   Cannot allocate memory
> % Execution halted at: GSI_RADSTAT_HISTOGRAM  93
>
> The offending line in question is:
>
> pdf = HISTOGRAM( tb_data, $
>                 BINSIZE = _binsize, $
>                 LOCATIONS = xbin )
>
> The error occurs at the third channel even if I DO NOT subset the data,
> keeping all 10600 elements e.g.:
>
> channel 1
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      47165566
>   NUM_ALLOC     LONG      24028618
>   NUM_FREE      LONG      24026847
>   HIGHWATER     LONG      48098350
>
> channel 2
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      50431979
>   NUM_ALLOC     LONG      24341060
>   NUM_FREE      LONG      24335087
>   HIGHWATER     LONG      51364763
>
> channel 3
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      50431979
>   NUM_ALLOC     LONG      24658491
>   NUM_FREE      LONG      24652518
>   HIGHWATER     LONG      51364763
>
> It would appear (to me at least) that the physical sizes of my arrays in
> question are not at issue here - I get the unable-to-allocate error even
> if I am using a fraction of the total.
>
> Does anyone have any idea what could be causing this error? And how to
> fix it?
>

```

```

> Thanks,
>
> paulv
>
>
> p.s. I have a typical linux redhat system, 4GB memory, RHEL6
> IDL> !version
> {
>   ARCH: "x86_64",
>   OS: "linux",
>   OS_FAMILY: "unix",
>   OS_NAME: "linux",
>   RELEASE: "8.3",
>   BUILD_DATE: "Nov 15 2013",
>   MEMORY_BITS: 64,
>   FILE_OFFSET_BITS: 64
> }
>
>
> p.p.s. Potential red herring: I was having licensing issues the day
> before yesterday that required me to restart (to get lmgrd working
> properly). Unfortunately I didn't run this code that fails until today.
>
>
> p.p.p.s. I have a test program for this particular histogram utility
> into which I put memory output as it generates six histograms:
>
> IDL> test_gsi_radstat
> % Compiled module: TEST_GSI_RADSTAT.
> % Compiled module: READ_DIAGS.
> % Compiled module: GSI_RADSTAT_HISTOGRAM.
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      412374977
>   NUM_ALLOC     LONG      1308019
>   NUM_FREE      LONG      1307012
>   HIGHWATER     LONG      421668193
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      418893819
>   NUM_ALLOC     LONG      1436201
>   NUM_FREE      LONG      1417730
>   HIGHWATER     LONG      428187035
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      420167967
>   NUM_ALLOC     LONG      1538103
>   NUM_FREE      LONG      1512960
>   HIGHWATER     LONG      429461183
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      422355746

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```
> NUM_ALLOC    LONG    1673174
> NUM_FREE     LONG    1639501
> HIGHWATER    LONG    431648962
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG    423641670
> NUM_ALLOC    LONG    1775399
> NUM_FREE     LONG    1735101
> HIGHWATER    LONG    432934886
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG    424951845
> NUM_ALLOC    LONG    1877609
> NUM_FREE     LONG    1830749
> HIGHWATER    LONG    434245061
>
> Note the much higher memory usage but lower NUM_ALLOC and NUM_FREE.
```

Check your data min/max and `_binsize`. Hint:

```
IDL> help, histogram([0,1d10], binsize=1)
% Unable to allocate memory: to make array.
  Cannot allocate memory
% Execution halted at: $MAIN$
```

regards,
Lajos
