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
> }
>

> 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

>
> 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

>   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
