Subject: Program caused arithmetic error: Floating underflow
Posted by g.nacarts on Wed, 18 Jun 2014 09:37:26 GMT

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Hi

I have the following expression:

value = 0

for i=0, 283 do begin
 for j=0, 283 do begin
 value = (value + (A[i,j]-B[i,j])^2.)/17000.
 endfor
endfor

when I type, print value I got the following error:
% Program caused arithmetic error: Floating underflow

Does anyone know why this happens?

Regards,
Gina

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by Fabzi on Wed, 18 Jun 2014 09:52:14 GMT

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Hi,

On 18.06.2014 11:37, g.nacarts@gmail.com wrote:
> % Program caused arithmetic error: Floating underflow

typing the exact same error message in search engines gives very helpful
and pertinent links, the first result in g**g** being:

http://www.idlcoyote.com/math_tips/underflow.html

Cheers,

Fabien

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by g.nacarts on Wed, 18 Jun 2014 10:10:16 GMT

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Thanks for your response. Actually I already had a look on this link but I couldn't manage to solve my problem. I used the L to make it LONG but I didn't see any number in the outputs.

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by Fabzi on Wed, 18 Jun 2014 11:37:17 GMT
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On 18.06.2014 12:10, g.nacarts@gmail.com wrote:
> I couldn't manage to solve my problem.

Well it's mostly not a problem and could be ignored. It depends on your numbers A and B:

IDL> print, 1e-30 / 17000
   5.88235e-35
IDL> print, 1e-50 / 17000
     0.00000
% Program caused arithmetic error: Floating underflow

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by Matthew Argall on Wed, 18 Jun 2014 11:40:35 GMT
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Note that in the last iteration, your result will essentially be divided by $((17000^{283})^{283})$.

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by g.nacarts on Wed, 18 Jun 2014 12:11:11 GMT
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Well, I can't ignore it because I need the values of the parameter "value" as shown in the expression. But since this cause an overflow I didn't get any result. There is any way to overcome this issue?

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by Fabzi on Wed, 18 Jun 2014 12:28:48 GMT
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I don't think that normal computers are made to represent the number $((17000^{283})^{283})$ as Matthew pointed out. Maybe you need to explain why you want to divide your value by the size of the universe ... twice.

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by Fabzi on Wed, 18 Jun 2014 12:59:00 GMT

... if you sure that the formulation of your loop is correct you could
try using double precision numbers. This will just allow value to become
even closer to 0 than it was already:

IDL> print, 1e-50 / 17000
      0.00000
% Program caused arithmetic error: Floating underflow
IDL> print, 1d-50 / 17000d
   5.8823529e-55

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by g.nacarts on Wed, 18 Jun 2014 15:38:45 GMT

Why the last iteration will be divided by $(17000^{283})^{283}$? I thought that for each iteration the value be divided by 17000.

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by   on Wed, 18 Jun 2014 16:05:26 GMT

Den onsdagen den 18:e juni 2014 kl. 17:38:45 UTC+2 skrev g.na...@gmail.com:
> Why the last iteration will be divided by $(17000^{283})^{283}$? I thought that for each iteration the value be divided by 17000.

The value from the first iteration will be divided by that number. The contribution from each iteration will be divided by one factor 17000 less than the previous one. The value from the last iteration will be divided by 17000 only.

Subject: Re: Program caused arithmetic error: Floating underflow
Posted by Chip Helms on Wed, 18 Jun 2014 16:10:40 GMT

On Wednesday, June 18, 2014 3:38:45 PM UTC, g.na...@gmail.com wrote:
> Why the last iteration will be divided by $(17000^{283})^{283}$? I thought that for each iteration the value be divided by 17000.

If you still find yourself having issues locating the problem, you might double check that the issue isn't occurring somewhere else nearby in the code (I believe the default behavior is for IDL to issue math error warnings only when it returns to interactive prompt). If you set !EXCEPT=2, IDL

will issue warnings (complete with line numbers) at the time the error occurs.

 http://www.exelisvis.com/docs/error_handling_system_va.html# sysvars_272074529_1002623

Also, currently, your code is dividing the current running total by 17000 at each step (so the division occurs 284*284 or 80656 times, granted it's not the same as finding the total and dividing by 17000d^80656). I'm guessing this is to converge on the parameter value iteratively?

Cheers,
Chip