Subject: Floats
Posted by Liberum on Wed, 08 Mar 2006 20:52:11 GMT
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Hello,

Here is a silly question: Can I define a float array and control how
many decimal places are kept? For example, I want all values to only
have an accuracy to the nearest 100th (20.15 and not 20.154983445).
Kind of like in printing, you know, the f5.2 print definition, but only
for variables and arrrays.

Thanks,
Sheldon

Subject: Re: Floats
Posted by David Fanning on Thu, 09 Mar 2006 14:19:55 GMT
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Kenneth P. Bowman writes:

> Obviously there was insufficient irony in my previous post (... how to
> convey tone of voice?).

I find if you are going for irony you have to put a "yeah" or
an "uh" in the sentence. At the very least, you have to
punctuate with a "!?". It's an art, more than a science. :-)

Cheers,

David

P.S. Let's just say it helps to have a reputation for
nonsense, too. You are falling WAY short in that
category, Ken. :-)

--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: Floats
Posted by Mark Hadfield on Thu, 09 Mar 2006 21:10:55 GMT
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David Fanning wrote:
> I find if you are going for irony you have to put a "yeah" or
> an "uh" in the sentence. At the very least, you have to
> punctuate with a "!?". It's an art, more than a science. :-)

It is sometimes said that Americans don't do irony. This is demonstrably false (just listen to any sitcom for 5 minutes--irony flying around the room). What they don't do is subtlety.

Oops, I forgot ... :-)

--
Mark Hadfield "Kei puwaha te tai nei, Hoea tahi tatou"
m.hadfield@niwa.co.nz
National Institute for Water and Atmospheric Research (NIWA)

Subject: Re: Floats
Posted by Liberum on Fri, 10 Mar 2006 09:29:01 GMT
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Boy, you guys really went off on this issue. But it is good.
Much is revealed about IDL, the art of programming, and, an added extra, the personalities of the writers :)
To answer an earlier question of why I asked. Well, maybe I am just too curious about things :)
I used Matlab before and it had the possibility to limit the precision.
But I could not control it too much.
I am working with a large number of arrays and averaging millions of pixel values. As a result I am getting rounding errors.
I stop the program here and there and check the data at different points. As such I only want a precision to the nearest hundreth.
It makes for quick assessment. Silly but,I am still learning :)
I need to understand more fundemental things about ROUND, FIX, FLOAT, and LONG so as to eliminate some of these annoying errors. (Thanks David for the info)
Using double precision seem to be the next step for me.

/Sheldon

Subject: Re: Floats
Posted by Kenneth P. Bowman on Fri, 10 Mar 2006 14:27:43 GMT
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In article <duq5l0$8j6$1@newsreader.mailgate.org>,
Mark Hadfield <m.hadfield@niwa.co.nz> wrote:

> It is sometimes said that Americans don't do irony. This is demonstrably
> false (just listen to any sitcom for 5 minutes--irony flying around the
> room). What they don't do is subtlety.

WHO SAYS WE DON'T DO SUBTLETY?!!! THAT'S THE DUMBEST THING I EVER HEARD!!! WE ALSO DO HYPERBOLE.

Ken

Subject: Re: Floats
Posted by Paul Van Delst[1] on Fri, 10 Mar 2006 16:45:59 GMT
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Sheldon wrote:
> Boy, you guys really went off on this issue. But it is good.
> Much is revealed about IDL, the art of programming, and, an added
> extra, the personalities of the writers :)
> To answer an earlier question of why I asked. Well, maybe I am just too
> curious about things :)
> I used Matlab before and it had the possibility to limit the precision.
> But I could not control it too much.
> I am working with a large number of arrays and averaging millions of
> pixel values. As a result I am getting rounding errors.
> I stop the program here and there and check the data at different
> points. As such I only want a precision to the nearest hundreth.
> It makes for quick assessment. Silly but,I am still learning :)
> I need to understand more fundemental things about ROUND, FIX, FLOAT,
> and LONG so as to eliminate some of these annoying errors. (Thanks
> David for the info)
> Using double precision seem to be the next step for me.

Ah. You mentioning rounding errors as "annoying" sends up a red flag for me. :o) You should /expect/ this to occur if you're adding a whole bunch of numbers, and your algorithm should handle it - especially if the end result is affected (sometimes rounding errors only show up in intermediate results and the end result is fine.) I don't think use of ROUND, FIX, FLOAT, and LONG should be considered until the problem is better understood.

You might want to consider using a compensated summation routine to sum your millions of pixel values to minimise rounding errors. A popular (or, at least, better known) method is also called Kahan summation. There is also doubly compenated summation which requires the data being summed to be sorted in ascending order.

Depending on your problem (e.g. sorting the data first may be too onerous), one or the other should do. (Although maybe the TOTAL function in IDL already does this?)

Anyway, check out chapter 4 of "Accuracy and Stability of Numerical Algorithms" by

Nicholas Higham. Accuarate summation of floating point numbers is exhaustively dealt with.

paulv

--
Paul van Delst
CIMSS @ NOAA/NCEP/EMC

Subject: Re: Floats
Posted by R.Bauer on Sat, 11 Mar 2006 12:08:54 GMT
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Sheldon wrote:
> Hello,
>
> Here is a silly question: Can I define a float array and control how
> many decimal places are kept? For example, I want all values to only
> have an accuracy to the nearest 100th (20.15 and not 20.154983445).
> Kind of like in printing, you know, the f5.2 print definition, but only
> for variables and arrrays.
>
> Thanks,
> Sheldon
>

Hi Sheldon

we do this this way

```
IDL> array = RandomU(-3L, 4, 5)
IDL> print,array
    0.897916     0.558249     0.766930     0.589101
   0.0603181     0.973112    0.0378892     0.218058
    0.142394     0.984703     0.894904     0.947651
    0.804079     0.160385     0.208246     0.818130
    0.103716     0.741117    0.0134482    0.0960160

IDL> array=float(string(array,format='(F7.2)'))
IDL> print,array
    0.900000     0.560000     0.770000     0.590000    0.0600000
0.970000    0.0400000     0.220000
    0.140000     0.980000     0.890000     0.950000     0.800000
0.160000     0.210000     0.820000
    0.100000     0.740000   0.01000000     0.100000
```

cheers

Reimar

--
Reimar Bauer

Institut fuer Stratosphaerische Chemie (ICG-I)
Forschungszentrum Juelich
email: R.Bauer@fz-juelich.de
---------- -------
a IDL library at ForschungsZentrum Juelich
http://www.fz-juelich.de/icg/icg-i/idl_icglib/idl_lib_intro. html
========== =======

Subject: Re: Floats
Posted by Liberum on Sun, 12 Mar 2006 08:22:47 GMT
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Thanks Reimar.
Very smart idea.

Sheldon

Subject: Re: Floats
Posted by Liberum on Sun, 12 Mar 2006 08:32:38 GMT
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Thanks Paul,

I found this out last Friday that the end results change even though
the intermediate looks fine - naturally, as I summed millions more
pixel values. The solution was double().
Now I am back to where I started, looking at double precision values
but I got some answers here to help me quickly assess the results.

Much obliged,
Sheldon
