
Subject: Re: Precision Problem

Posted by [Paul Van Delst\[1\]](#) on Mon, 24 Jul 2006 19:00:03 GMT

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DMac wrote:

```
> Hello All,  
> Using IDL version 6.2 on a Windows XP machine I am reading in a set of  
> coordinates from a binary file (it is LiDAR data stored in LAS Version  
> 1.0 format) stored in UTM NAD83 Zone 11 and these points are stored as  
> 4 byte long integers in the binary file . The coordinates are stored  
> in the binary file with an offset such that they need to be divided by  
> 100 to obtain the actual coordinates. The binary file is read into a  
> heap variable (Data below). The X and Y coordinates are then written  
> from the heap variable into a double precision array as follows:  
>  
>     x = dblarr(Num_pts)  
>     x = TEMPORARY(data.x*1.000e-002)  
>  
>     y = dblarr(Num_pts)  
>     y = TEMPORARY(data.y*1.000e-002)
```

That is going to give you single precision arrays.

```
IDL> x=dblarr(num_pts)  
IDL> x = TEMPORARY(data.x*1.000e-002)  
IDL> help, x  
X          FLOAT    = Array[100]
```

You need to do

```
IDL> x = TEMPORARY(data.x*1.000d-002)  
IDL> help, x  
X          DOUBLE   = Array[100]
```

i.e. using 1.000d-002 rather than the single precision literal 1.000e-002.

I don't think the TEMPORARY() is doing anything either since the argument is an expression which is pretty much temporary already.

All you need to is:

```
scale_factor=1.0d-02  
x = data.x*scale_factor  
y = data.y*scale_factor
```

to get the double precision arrays at the required size.

As to why your final "y" array is bogus, I don't know. Maybe data.y is somehow bugged up prior to your scaling?. My little tests gave the expected result.

Maybe on Windows if you do a TEMPORARY(data.x*1.000e-002) is whacks the entire structure?
(I hope not)

paulv

--

Paul van Delst Ride lots.
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Subject: Re: Precision Problem
Posted by [Bruce Bowler](#) on Mon, 24 Jul 2006 19:19:29 GMT
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On Mon, 24 Jul 2006 09:51:40 -0700, DMac put fingers to keyboard and said:

- > shapefile. The X coordinates are fine. The X coordinates are 6 digits
- > to the left of the decimal place while the Y coordinates are 7 digits
- > to the left of the decimal place

As Paul pointed out, you're getting single precision rather than double precision.

Are the 6 and 7 digits before or after the conversion? If after, the problems are both related as 7 digits is typically the limit of the number of significant digits in a SP number (I think :-). The range is $10^{+/-38}$, but # of significant digits is much less.

Bruce

--

+-----+-----+
Bruce Bowler | People want economy and they will pay any price to
1.207.633.9600 | get it. - Lee Iacocca
bbowler@bigelow.org |
+-----+-----+

Subject: Re: Precision Problem
Posted by [Paul Van Delst\[1\]](#) on Mon, 24 Jul 2006 19:33:03 GMT
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Bruce Bowler wrote:

- > On Mon, 24 Jul 2006 09:51:40 -0700, DMac put fingers to keyboard and said:

>
>
>> shapefile. The X coordinates are fine. The X coordinates are 6 digits
>> to the left of the decimal place while the Y coordinates are 7 digits
>> to the left of the decimal place
>
>
> As Paul pointed out, you're getting single precision rather than double
> precision.
>
> Are the 6 and 7 digits before or after the conversion? If after, the
> problems are both related as 7 digits is typically the limit of the number
> of significant digits in a SP number (I think :-). The range is
> $10^{+/-38}$, but # of significant digits is much less.

Ah, yeah. I misunderstood the explanation and totally missed the 6-7 digit clue there. I thought the y-values were just integers, no decimals at all.

You're correct. If you want more than 6/7 decimal place precision, you need double (at least, for it to be meaningful):

```
IDL> x=10000000.0
IDL> print, x, format='(f12.2)'
 10000000.00
IDL> x=x+0.1
IDL> print, x, format='(f12.2)'
 10000000.00
```

```
IDL> x=10000000.0d
IDL> print, x, format='(f12.2)'
 10000000.00
IDL> x=x+0.1d
IDL> print, x, format='(f12.2)'
 10000000.10
```

paulv

--

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Subject: Re: Precision Problem
Posted by [Paul Van Delst\[1\]](#) on Mon, 24 Jul 2006 19:34:23 GMT

Paul Van Delst wrote:

> You're correct. If you want more than 6/7 decimal place precision, you

I really should have said if you want more than 6/7 meaningful significant figures...

> need double (at least, for it to be meaningful):

>

> IDL> x=10000000.0

> IDL> print, x, format='(f12.2)'

> 10000000.00

> IDL> x=x+0.1

> IDL> print, x, format='(f12.2)'

> 10000000.00

>

> IDL> x=10000000.0d

> IDL> print, x, format='(f12.2)'

> 10000000.00

> IDL> x=x+0.1d

> IDL> print, x, format='(f12.2)'

> 10000000.10

>

>

> paulv

>

--

Paul van Delst Ride lots.

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Subject: Re: Precision Problem

Posted by [DMac](#) on Mon, 24 Jul 2006 21:05:08 GMT

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Thanks a bunch guys. That was the problem i.e. I should use 1.000d-002 rather than the single precision literal 1.000e-002.

Solved all my problems.

I really appreciate the prompt and accurate replies.

Derek M.

Paul Van Delst wrote:

> Paul Van Delst wrote:

>> You're correct. If you want more than 6/7 decimal place precision, you

>

> I really should have said if you want more than 6/7 meaningful significant figures...

>

>

>> need double (at least, for it to be meaningful):

>>

>> IDL> x=10000000.0

>> IDL> print, x, format='(f12.2)'

>> 10000000.00

>> IDL> x=x+0.1

>> IDL> print, x, format='(f12.2)'

>> 10000000.00

>>

>> IDL> x=10000000.0d

>> IDL> print, x, format='(f12.2)'

>> 10000000.00

>> IDL> x=x+0.1d

>> IDL> print, x, format='(f12.2)'

>> 10000000.10

>>

>>

>> paulv

>>

>

>

> --

> Paul van Delst Ride lots.

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