
Subject: Re: Friday Afternoon Puzzler
Posted by [pgrigis](#) on Fri, 12 Jun 2009 21:07:38 GMT
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David Fanning wrote:

```
> Folks,  
>  
> If you've already had a beer, you may want to work  
> on this one. Should we be concerned? Or is this just  
> one more example for the Sky is Falling article?  
> I've voiced my opinion, but it didn't satisfy the  
> complainant. What say you?  
>  
> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]  
> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]  
> curly = curly*!PI/180.  
> larry *= !PI/180.
```

I'd argue that you are multiplying curly by pi and dividing the result by 180 in the first line, and dividing pi by 180 first and multiplying larry by the result in the second line. Therefore, you are performing two different set of floating point operations, therefore I am not surprised they give slightly different results.

Ciao,
Paolo

```
> diff=curly-larry  
> print,diff  
>  
> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]  
> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]  
> curly = curly*!PI/180.  
> larry = larry*!PI/180.  
> diff=curly-larry  
> print,diff  
>  
> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]  
> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]  
> curly *= !PI/180.  
> larry *= !PI/180.  
> diff=curly-larry  
> print,diff  
>  
> The results:
```

>
> -3.72529e-009 0.000000 0.000000-9.31323e-010 0.000000
> 0.000000 0.000000
> 0.000000 0.000000 0.000000 0.000000 0.000000
> 0.000000 0.000000
> 0.000000 0.000000 0.000000 0.000000 0.000000
> 0.000000 0.000000
>
>
> Why aren't the first set of differences (where the assignment
> is made with the *= operator) *exactly* zero?
>
> Cheers,
>
> David
>
>
> --
> David Fanning, Ph.D.
> Fanning Software Consulting, Inc.
> Coyote's Guide to IDL Programming: <http://www.dfanning.com/>
> Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Friday Afternoon Puzzler

Posted by [Kenneth P. Bowman](#) on Fri, 12 Jun 2009 21:09:09 GMT

[View Forum Message](#) <> [Reply to Message](#)

In article <MPG.249c6dccba4246d098a6e1@news.giganews.com>,
David Fanning <news@dfanning.com> wrote:

> Folks,
>
> If you've already had a beer, you may want to work
> on this one. Should we be concerned? Or is this just
> one more example for the Sky is Falling article?
> I've voiced my opinion, but it didn't satisfy the
> complainant. What say you?
>
> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
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> curly = curly*!PI/180.
> larry *= !PI/180.
> diff=curly-larry
> print,diff
>
> Why aren't the first set of differences (where the assignment
> is made with the *= operator) *exactly* zero?

>
> Cheers,
>
> David

My guess is that the compiler/interpreter does the multiplication and division operations in a different order in the two statements in the first case. The other two cases are syntactically identical, so the operations should be carried out in the same order.

Why the operations are done in a different order is the meta-question.

Ken Bowman

Subject: Re: Friday Afternoon Puzzler
Posted by [pgrigis](#) on Fri, 12 Jun 2009 21:09:47 GMT
[View Forum Message](#) <> [Reply to Message](#)

Paolo wrote:

> David Fanning wrote:
>> Folks,
>>
>> If you've already had a beer, you may want to work
>> on this one. Should we be concerned? Or is this just
>> one more example for the Sky is Falling article?
>> I've voiced my opinion, but it didn't satisfy the
>> complainant. What say you?
>>
>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> curly = curly*!PI/180.
>> larry *= !PI/180.
>
> I'd argue that you are multiplying curly by pi and dividing the result
> by 180
> in the first line, and dividing pi by 180 first and multiplying larry
> by the result
> in the second line. Therefore, you are performing two different set of
> floating
> point operations, therefore I am not surprised they give slightly
> different results.

In other words, $(a*b)/c$ is different than $a*(b/c)$ with floats

Paolo

```

>
> Ciao,
> Paolo
>
>> diff=curly-larry
>> print,diff
>>
>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
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>> curly = curly*!PI/180.
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>> print,diff
>>
>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> curly *= !PI/180.
>> larry *= !PI/180.
>> diff=curly-larry
>> print,diff
>>
>> The results:
>>
>> -3.72529e-009  0.000000  0.000000-9.31323e-010  0.000000
>> 0.000000  0.000000
>> 0.000000  0.000000  0.000000  0.000000  0.000000
>> 0.000000  0.000000
>> 0.000000  0.000000  0.000000  0.000000  0.000000
>> 0.000000  0.000000
>>
>>
>> Why aren't the first set of differences (where the assignment
>> is made with the *= operator) *exactly* zero?
>>
>> Cheers,
>>
>> David
>>
>>
>> --
>> David Fanning, Ph.D.
>> Fanning Software Consulting, Inc.
>> Coyote's Guide to IDL Programming: http://www.dfanning.com/
>> Sepore ma de ni thui. ("Perhaps thou speakest truth.")

```

Subject: Re: Friday Afternoon Puzzler

Posted by [pgrigis](#) on Fri, 12 Jun 2009 21:15:10 GMT

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Paolo wrote:

> Paolo wrote:

>> David Fanning wrote:

>>> Folks,

>>>

>>> If you've already had a beer, you may want to work
>>> on this one. Should we be concerned? Or is this just
>>> one more example for the Sky is Falling article?

>>> I've voiced my opinion, but it didn't satisfy the
>>> complainant. What say you?

>>>

>>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]

>>> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]

>>> curly = curly*!PI/180.

>>> larry *= !PI/180.

>>

>> I'd argue that you are multiplying curly by pi and dividing the result
>> by 180

>> in the first line, and dividing pi by 180 first and multiplying larry
>> by the result

>> in the second line. Therefore, you are performing two different set of
>> floating

>> point operations, therefore I am not surprised they give slightly
>> different results.

>

> In other words, $(a*b)/c$ is different than $a*(b/c)$ with floats

IDL> a=0.32

IDL> b=!Pi

IDL> c=180.0

IDL> print,(a*b)/c-a*(b/c)

4.65661e-10

It seems I can't resist to comment on my own posts today :)

Paolo

>

> Paolo

>

>>

>> Ciao,

>> Paolo

>>

>>> diff=curly-larry

>>> print,diff

```

>>>
>>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>>> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>>> curly = curly*!PI/180.
>>> larry = larry*!PI/180.
>>> diff=curly-larry
>>> print,diff
>>>
>>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>>> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>>> curly *= !PI/180.
>>> larry *= !PI/180.
>>> diff=curly-larry
>>> print,diff
>>>
>>> The results:
>>>
>>> -3.72529e-009  0.000000  0.000000-9.31323e-010  0.000000
>>> 0.000000  0.000000
>>> 0.000000  0.000000  0.000000  0.000000  0.000000
>>> 0.000000  0.000000
>>> 0.000000  0.000000  0.000000  0.000000  0.000000
>>> 0.000000  0.000000
>>>
>>>
>>> Why aren't the first set of differences (where the assignment
>>> is made with the *= operator) *exactly* zero?
>>>
>>> Cheers,
>>>
>>> David
>>>
>>>
>>> --
>>> David Fanning, Ph.D.
>>> Fanning Software Consulting, Inc.
>>> Coyote's Guide to IDL Programming: http://www.dfanning.com/
>>> Sepore ma de ni thui. ("Perhaps thou speakest truth.")

```

Subject: Re: Friday Afternoon Puzzler

Posted by [R.G. Stockwell](#) on Fri, 12 Jun 2009 21:23:16 GMT

[View Forum Message](#) <> [Reply to Message](#)

"Paolo" <pgrigis@gmail.com> wrote in message
 news:45fda197-6ddf-43c4-afe3-46d4bd1d4047@d38g2000prn.google groups.com...

>
 >

```

> David Fanning wrote:
>> Folks,
...
>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> curly = curly*!PI/180.
>> larry *= !PI/180.
>
> I'd argue that you are multiplying curly by pi and dividing the result
> by 180
> in the first line, and dividing pi by 180 first and multiplying larry
> by the result
> in the second line.

```

oddly:

```

curly =[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
larry =[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
schemp =[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
curlyjoe=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]

```

```

curly = curly*!PI/180.
larry *= !PI
larry /= 180.

```

```

curlyjoe /= 180.
curlyjoe *= !PI

```

```

schemp *= !PI
schemp *= 1./180.

```

```

diff=curly-larry
diff2=curly-schemp
diff3=curly-curlyjoe

```

```

print,diff
print,diff2
print,diff3

```

```
IDL> .GO
```

```
0.000000 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
```

```
0.000000 0.000000 1.86265e-009 9.31323e-010 4.65661e-010 4.65661e-010
1.86265e-009
```

```
0.000000 0.000000 1.86265e-009-9.31323e-010 0.000000 0.000000 0.000000
```

Subject: Re: Friday Afternoon Puzzler
Posted by [R.G. Stockwell](#) on Fri, 12 Jun 2009 21:30:44 GMT
[View Forum Message](#) <> [Reply to Message](#)

"R.G. Stockwell" <noemail87@please.com> wrote in message
news:h0uh0f\$k2n\$1@aioe.org...

specifically:

```
moe = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
moe2 = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
moe3 = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
```

```
moe *= 1. / 180.
moe2 /=180.
print, 'moe: ',moe - moe2
print, 'moe3: ',moe3 - moe3*1.
```

```
moe: 0.000000-9.31323e-010
      0.000000-4.65661e-010-1.16415e-010-1.16415e-010-4.65661e-010
```

```
moe3: 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
```

Subject: Re: Friday Afternoon Puzzler
Posted by [pgrigis](#) on Fri, 12 Jun 2009 21:32:55 GMT
[View Forum Message](#) <> [Reply to Message](#)

R.G. Stockwell wrote:

```
> "R.G. Stockwell" <noemail87@please.com> wrote in message
> news:h0uh0f$k2n$1@aioe.org...
```

```
>
```

```
>
```

```
>
```

```
> specifically:
```

```
>
```

```
> moe = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
> moe2 = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
> moe3 = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
```

```
>
```

```
> moe *= 1. / 180.
> moe2 /=180.
```

The first line means: moe=moe*(1./180.)
The second line: moe=moe/180.

Different operations, again.

Ciao,
Paolo

```
> print, 'moe: ',moe - moe2
> print, 'moe3: ',moe3 - moe3*1.
>
>
> moe: 0.000000-9.31323e-010
> 0.000000-4.65661e-010-1.16415e-010-1.16415e-010-4.65661e-010
>
> moe3: 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
```

Subject: Re: Friday Afternoon Puzzler
Posted by [R.G. Stockwell](#) on Fri, 12 Jun 2009 21:40:44 GMT
[View Forum Message](#) <> [Reply to Message](#)

```
"Paolo" <pgrigis@gmail.com> wrote in message
news:0d6bf583-80e0-4761-bc67-3c17aabe25ab@w35g2000prg.google groups.com...
>
>
> R.G. Stockwell wrote:
>> "R.G. Stockwell" <noemail87@please.com> wrote in message
>> news:h0uh0f$K2n$1@aioe.org...
>>
>>
>>
>> specifically:
>>
>> moe = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> moe2 = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>> moe3 = [-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
>>
>> moe *= 1. / 180.
>> moe2 /=180.
>
> The first line means: moe=moe*(1./180.)
> The second line: moe=moe/180.
> Different operations, again.
```

Of course (doh) I simplified too much,

I found the difference between curlyjoe and schemp odd
in my previous post a bit odd, and tried to zero in on it.

cheers,
bob

Subject: Re: Friday Afternoon Puzzler
Posted by [Michael Galloy](#) on Fri, 12 Jun 2009 22:40:06 GMT
[View Forum Message](#) <> [Reply to Message](#)

Kenneth P. Bowman wrote:

> In article <MPG.249c6dccba4246d098a6e1@news.giganews.com>,
> David Fanning <news@dfanning.com> wrote:

>
>> Folks,
>>
>> If you've already had a beer, you may want to work
>> on this one. Should we be concerned? Or is this just
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>> I've voiced my opinion, but it didn't satisfy the
>> complainant. What say you?

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>> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
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>>
>> Why aren't the first set of differences (where the assignment
>> is made with the *= operator) *exactly* zero?

>>
>> Cheers,
>>
>> David

>
> My guess is that the compiler/interpreter does the multiplication and
> division operations in a different order in the two statements in the
> first case. The other two cases are syntactically identical, so the
> operations should be carried out in the same order.

Yes, adding some parentheses makes the results agree:

```
IDL> curly=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
IDL> larry=[-1.912,-1.852,-1.386,-0.818,-0.343,-0.343,-1.233]
IDL> curly = curly*(!PI/180.)
IDL> larry *= !PI/180.
IDL> diff=curly-larry
IDL> print,diff
      0.00000    0.00000    0.00000    0.00000    0.00000
```

0.00000 0.00000

> *Why* the operations are done in a different order is the meta-
> question.

Well, in

curly = curly * !pi / 180.

operations are just done left to right since they all have the same
precedence. In

larry *= some_value

some_value must first be calculated in order to use the *= operator.

Mike

--

www.michaelgalloy.com

Associate Research Scientist

Tech-X Corporation
