# Subject: Re: Missing Data Programming Contest Posted by David Fanning on Wed, 08 Apr 2009 14:03:42 GMT

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# David Fanning writes:

You should assume:

>

1. The data can be any data type except complex or string. >

>

> 2. The missing value \*could\* be !VALUES.F\_NAN.

>

- 3. Unsophisticated users might be using your program, >
- so, for example, they might pass in a missing value >
- such as 594.32.

In response to an overwhelming number of questions, it \*is\* permissible to use Coyote Library routines. FLOATS EQUAL comes to mind. :-)

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: Missing Data Programming Contest Posted by R.Bauer on Wed, 08 Apr 2009 14:21:17 GMT View Forum Message <> Reply to Message

## David Fanning schrieb:

> Folks,

>

>

- I don't have time today to think about this, so I've
- decided to get you to do my thinking for me. :-)
- > Suppose you are expecting a data array and you suspect
- > the data has "missing values" in it that you wish to
- > exclude from further processing. You write a keyword
- > for your routine that allows the user to pass in what
- > he is using for the "missing value".

PRO Junker, data, MISSING\_VALUE=missing\_value >

- How would you write the code to assure that this missingvalue would be excluded from further processing?
- > You should assume:

>

>

- > 1. The data can be any data type except complex or string.
- > 2. The missing value \*could\* be !VALUES.F\_NAN.
- 3. Unsophisticated users might be using your program,
   so, for example, they might pass in a missing value
   such as 594.32.
  - 4. Very unsophisticated users don't care on types and passes a missing value which can't be found. e.g. 999.9 and the data is of type double.
- > No, this is NOT my homework! But I do need it ASAP. ;-)
- > Cheers,
- > David

Subject: Re: Missing Data Programming Contest Posted by R.Bauer on Wed, 08 Apr 2009 14:27:41 GMT View Forum Message <> Reply to Message

```
David Fanning schrieb:
```

> Folks,

>

>

> I don't have time today to think about this, so I've

> decided to get you to do my thinking for me. :-)

- > Suppose you are expecting a data array and you suspect
- > the data has "missing values" in it that you wish to
- > exclude from further processing. You write a keyword
- > for your routine that allows the user to pass in what
- > he is using for the "missing value".
- > PRO Junker, data, MISSING\_VALUE=missing\_value
- > How would you write the code to assure that this missing
- > value would be excluded from further processing?
- > You should assume:

Page 2 of 14 ---- Generated from comp.

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- 1. The data can be any data type except complex or string. > > 2. The missing value \*could\* be !VALUES.F\_NAN. > > 3. Unsophisticated users might be using your program, > so, for example, they might pass in a missing value > such as 594.32. > > No, this is NOT my homework! But I do need it ASAP. ;-) > > Cheers, > David That old tool (nearly 10 years) has some more parameters http://www.fz-juelich.de/icg/icg-1/idl\_icglib/idl\_source/idl\_work/rb\_lib/def\_valid\_for\_param.pro example at http://www.fz-juelich.de/icg/icg-1/idl icglib/idl source/idl html/examples/def valid for param example.pro.html cheers
- Subject: Re: Missing Data Programming Contest Posted by David Fanning on Wed, 08 Apr 2009 18:26:26 GMT View Forum Message <> Reply to Message

## David Fanning writes:

Reimar

> Suppose you are expecting a data array and you suspect > the data has "missing values" in it that you wish to > exclude from further processing. You write a keyword > for your routine that allows the user to pass in what > he is using for the "missing value". > PRO Junker, data, MISSING\_VALUE=missing\_value > > How would you write the code to assure that this missing value would be excluded from further processing? > You should assume: > > 1. The data can be any data type except complex or string. > > 2. The missing value \*could\* be !VALUES.F\_NAN. >

- > 3. Unsophisticated users might be using your program,
- > so, for example, they might pass in a missing value
- > such as 594.32.

Humm. The only really useful suggestion I've heard so far (I forgot my German dictionary today, so I'm not sure about Reimar's contribution) is to delete the MISSING\_VALUE keyword and let the user worry about it. Surely this can't be the ONLY suggestion!

Cheers,

David

--

David Fanning, Ph.D.
Coyote's Guide to IDL Programming (www.dfanning.com)
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Missing Data Programming Contest Posted by wlandsman on Wed, 08 Apr 2009 19:11:56 GMT View Forum Message <> Reply to Message

- > Humm. The only really useful suggestion I've heard so
- > far (I forgot my German dictionary today, so I'm not
- > sure about Reimar's contribution) is to delete the
- > MISSING\_VALUE keyword and let the user worry about
- > it. Surely this can't be the ONLY suggestion!

>

Well, I'll give the naive answer because I am not certain what the problem is. If the routine contains a MISSING = missing keyword, then you can decide whether the user wants a MISSING value or NAN. (Presumably a missing value rather than NAN is only useful for integer data.)

```
do_missing = 0
do_nan = 0
if N_elements(missing) GT 0 then $
    if finite(nan) then do_missing = 1 else do_nan = 1
```

and then you can process data accordingly. For example, to remove missing values from a variable x

```
if do_missing then begin
   g = where(x NE missing,Ng) ;or use FLOATS_EQUAL for testing
   if Ng GT 0 then x = x[g]
endif else if do_nan then x = x[where(finite(x)]
```

Subject: Re: Missing Data Programming Contest

```
Posted by Homeyer on Wed, 08 Apr 2009 23:02:51 GMT
View Forum Message <> Reply to Message
On Apr 8, 8:23 am, David Fanning <n...@dfanning.com> wrote:
> Folks,
>
> I don't have time today to think about this, so I've
> decided to get you to do my thinking for me. :-)
>
> Suppose you are expecting a data array and you suspect
> the data has "missing values" in it that you wish to
> exclude from further processing. You write a keyword
> for your routine that allows the user to pass in what
> he is using for the "missing value".
>
    PRO Junker, data, MISSING_VALUE=missing_value
>
> How would you write the code to assure that this missing
  value would be excluded from further processing?
>
> You should assume:
>
    1. The data can be any data type except complex or string.
>
>
    2. The missing value *could* be !VALUES.F_NAN.
>
>
    3. Unsophisticated users might be using your program,
      so, for example, they might pass in a missing value
>
      such as 594.32.
>
  No, this is NOT my homework! But I do need it ASAP. ;-)
>
>
> Cheers.
> David
> David Fanning, Ph.D.
> Fanning Software Consulting, Inc.
> Coyote's Guide to IDL Programming:http://www.dfanning.com/
```

The following should suffice:

> Sepore ma de ni thui. ("Perhaps thou speakest truth.")

```
IF (missing_value GT 0) THEN BEGIN
type = SIZE(array, /TNAME)

CASE type OF
'COMPLEX': MESSAGE, 'Complex values not allowed for removing
MISSING data.'
'STRING': MESSAGE, 'String values not allowed for removing
MISSING data.'
ELSE: invalid = WHERE((array EQ missing_value), iv_count,
COMPLEMENT = valid, NCOMPLEMENT = v_count)
ENDCASE

IF (v_count GT 0) THEN array = array[valid]
ENDIF
```

That is, if you dont care about overwriting the original data or it is not gridded. If it is gridded (data points with missing values should remain), then you could replace those with NaNs in the final array using the indices above.

Cheers, Cameron Homeyer

Subject: Re: Missing Data Programming Contest Posted by Homeyer on Wed, 08 Apr 2009 23:26:19 GMT View Forum Message <> Reply to Message

```
On Apr 8, 6:02 pm, Homeyer <cam.the.weather....@gmail.com> wrote:
> On Apr 8, 8:23 am, David Fanning <n...@dfanning.com> wrote:
>
>> Folks,
>> I don't have time today to think about this, so I've
>> decided to get you to do my thinking for me. :-)
>
>> Suppose you are expecting a data array and you suspect
>> the data has "missing values" in it that you wish to
>> exclude from further processing. You write a keyword
>> for your routine that allows the user to pass in what
>> he is using for the "missing value".
>
     PRO Junker, data, MISSING_VALUE=missing_value
>>
>> How would you write the code to assure that this missing
```

```
>> value would be excluded from further processing?
>> You should assume:
     1. The data can be any data type except complex or string.
>>
     2. The missing value *could* be !VALUES.F_NAN.
>>
     3. Unsophisticated users might be using your program,
>>
       so, for example, they might pass in a missing value
>>
       such as 594.32.
>>
>> No, this is NOT my homework! But I do need it ASAP. ;-)
>
>> 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.")
  The following should suffice:
 IF (missing_value GT 0) THEN BEGIN
    type = SIZE(array, /TNAME)
>
>
    CASE type OF
>
      'COMPLEX': MESSAGE, 'Complex values not allowed for removing
>
  MISSING data.'
      'STRING': MESSAGE, 'String values not allowed for removing
>
  MISSING data.'
      ELSE
               : invalid = WHERE((array EQ missing_value), iv_count,
 COMPLEMENT = valid, NCOMPLEMENT = v_count)
    ENDCASE
>
    IF (v count GT 0) THEN array = array[valid]
 ENDIF
> That is, if you dont care about overwriting the original data or it is
> not gridded. If it is gridded (data points with missing values should
> remain), then you could replace those with NaNs in the final array
> using the indices above.
>
> Cheers,
> Cameron Homeyer
```

oops, missed the NaN part:

This would go before the last IF (v\_count...

IF (~FINITE(missing)) THEN invalid = WHERE(~FINITE(array), iv\_count, COMPLEMENT = valid, NCOMPLEMENT = v\_count)

Subject: Re: Missing Data Programming Contest

```
Posted by R.Bauer on Thu, 09 Apr 2009 08:32:34 GMT
View Forum Message <> Reply to Message
Homeyer schrieb:
> On Apr 8, 6:02 pm, Homeyer <cam.the.weather....@gmail.com> wrote:
>> On Apr 8, 8:23 am, David Fanning <n...@dfanning.com> wrote:
>>
>>
>>
>>> Folks,
>>> I don't have time today to think about this, so I've
>>> decided to get you to do my thinking for me. :-)
>>> Suppose you are expecting a data array and you suspect
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>>> exclude from further processing. You write a keyword
>>> for your routine that allows the user to pass in what
>>> he is using for the "missing value".
      PRO Junker, data, MISSING_VALUE=missing_value
>>>
>>> How would you write the code to assure that this missing
>>> value would be excluded from further processing?
>>> You should assume:
      1. The data can be any data type except complex or string.
      2. The missing value *could* be !VALUES.F NAN.
>>>
      3. Unsophisticated users might be using your program,
>>>
        so, for example, they might pass in a missing value
>>>
        such as 594.32.
>>>
>>> No, this is NOT my homework! But I do need it ASAP. ;-)
>>> 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.")
>> The following should suffice:
>>
>> IF (missing_value GT 0) THEN BEGIN
     type = SIZE(array, /TNAME)
>>
>>
```

```
CASE type OF
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       'COMPLEX': MESSAGE, 'Complex values not allowed for removing
>>
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       'STRING': MESSAGE, 'String values not allowed for removing
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       ELSE
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     ENDCASE
>>
>>
     IF (v count GT 0) THEN array = array[valid]
>>
>> ENDIF
>> That is, if you dont care about overwriting the original data or it is
>> not gridded. If it is gridded (data points with missing values should
>> remain), then you could replace those with NaNs in the final array
>> using the indices above.
>>
>> Cheers,
>> Cameron Homeyer
  oops, missed the NaN part:
  This would go before the last IF (v_count...
>
 IF (~FINITE(missing)) THEN invalid = WHERE(~FINITE(array), iv_count,
  COMPLEMENT = valid, NCOMPLEMENT = v count)
```

What is the meaning of ~ in front of the function name?

Subject: Re: Missing Data Programming Contest
Posted by Carsten Lechte on Thu, 09 Apr 2009 08:51:34 GMT
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#### Reimar Bauer wrote:

> What is the meaning of ~ in front of the function name?

Logical negation.

chl

Subject: Re: Missing Data Programming Contest Posted by Homeyer on Thu, 09 Apr 2009 12:41:24 GMT View Forum Message <> Reply to Message

```
On Apr 8, 6:26 pm, Homeyer <cam.the.weather....@gmail.com> wrote:
> On Apr 8, 6:02 pm, Homeyer <cam.the.weather....@gmail.com> wrote:
>
>
>> On Apr 8, 8:23 am, David Fanning <n...@dfanning.com> wrote:
>>> Folks,
>>> I don't have time today to think about this, so I've
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>>> Suppose you are expecting a data array and you suspect
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>>> for your routine that allows the user to pass in what
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>>>
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>>>
>
      2. The missing value *could* be !VALUES.F_NAN.
>>>
>
      3. Unsophisticated users might be using your program,
>>>
        so, for example, they might pass in a missing value
>>>
        such as 594.32.
>>>
>>> No, this is NOT my homework! But I do need it ASAP. ;-)
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>>> 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.")
>
>> The following should suffice:
>> IF (missing value GT 0) THEN BEGIN
     type = SIZE(array, /TNAME)
```

```
>
     CASE type OF
>>
       'COMPLEX': MESSAGE, 'Complex values not allowed for removing
>>
>> MISSING data.'
       'STRING': MESSAGE, 'String values not allowed for removing
>> MISSING data.'
               : invalid = WHERE((array EQ missing_value), iv_count,
       ELSE
>> COMPLEMENT = valid, NCOMPLEMENT = v_count)
     ENDCASE
>
>>
     IF (v_count GT 0) THEN array = array[valid]
>> ENDIF
>
>> That is, if you dont care about overwriting the original data or it is
>> not gridded. If it is gridded (data points with missing values should
>> remain), then you could replace those with NaNs in the final array
>> using the indices above.
>> Cheers.
>> Cameron Homeyer
 oops, missed the NaN part:
>
  This would go before the last IF (v_count...
> IF (~FINITE(missing)) THEN invalid = WHERE(~FINITE(array), iv_count,
> COMPLEMENT = valid, NCOMPLEMENT = v_count)
The first IF statement should be "IF (N ELEMENTS(missing value) GT 0)
```

Subject: Re: Missing Data Programming Contest Posted by David Fanning on Thu, 09 Apr 2009 15:59:59 GMT View Forum Message <> Reply to Message

## David Fanning writes:

THEN BEGIN" as well.

```
You should assume:
1. The data can be any data type except complex or string.
2. The missing value *could* be !VALUES.F_NAN.
3. Unsophisticated users might be using your program,
so, for example, they might pass in a missing value
such as 594.32.
```

> No, this is NOT my homework! But I do need it ASAP. ;-)

Thanks all, for your help. This was a more difficult problem than I expected it to be, but this was probably due to my program structure more than anything else. I was hoping for a general solution, but couldn't see my way through to that. Maybe next time.

In the end, I ended up replacing "missing" values with NANs, and then dealing with those just before processing. This is always complicated, of course, by not knowing a priori what kind of data you are talking about, so there is complicated code to deal with all of that. It's a bit of a dog's dish, but at least it works. :-)

Cheers.

David

David Fanning, Ph.D. Coyote's Guide to IDL Programming (www.dfanning.com) Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Missing Data Programming Contest Posted by R.Bauer on Thu, 09 Apr 2009 16:22:32 GMT View Forum Message <> Reply to Message

```
David Fanning schrieb:
```

- > David Fanning writes:
- >> You should assume:

>>

1. The data can be any data type except complex or string. >>

>> >>

2. The missing value \*could\* be !VALUES.F\_NAN.

>>

3. Unsophisticated users might be using your program, >> so, for example, they might pass in a missing value >> such as 594.32. >>

>> No, this is NOT my homework! But I do need it ASAP. ;-)

>>

- > Thanks all, for your help. This was a more difficult problem
- > than I expected it to be, but this was probably due to my
- > program structure more than anything else. I was hoping for
- > a general solution, but couldn't see my way through to that.

```
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> NANs, and then dealing with those just before processing.
> This is always complicated, of course, by not knowing
> a priori what kind of data you are talking about, so there
> is complicated code to deal with all of that. It's a bit
 of a dog's dish, but at least it works. :-)
> Cheers,
>
> David
it works only for float or double but not
for everything of spec 1.
e.g. byte, long, structure ...
IDL> help,z
Ζ
          ULONG64 = Array[3]
IDL > z[1] = !values.f nan
% Program caused arithmetic error: Floating illegal operand
IDL> help,z
Ζ
          ULONG64 = Array[3]
IDL> print,z
             1 9223372036854775808
                                                   1
that's fun or?
/me personally hates dealing with data when I don't know some more
specs. e.g. units, missing_value, fill_value, valid_min, valid_max
cheers
Reimar
```

Subject: Re: Missing Data Programming Contest Posted by David Fanning on Thu, 09 Apr 2009 16:34:39 GMT View Forum Message <> Reply to Message

#### Reimar Bauer writes:

- > it works only for float or double but not
- > for everything of spec 1.

```
e.g. byte, long, structure ...
IDL> help,z
Z ULONG64 = Array[3]
IDL> z[1] = !values.f_nan
% Program caused arithmetic error: Floating illegal operand
IDL> help,z
Z ULONG64 = Array[3]
IDL> print,z
1 9223372036854775808
that's fun or?
Yes, I have to convert integer data to float data to do the assignment. I don't check for structures
```

Cheers,

David

--

David Fanning, Ph.D.
Coyote's Guide to IDL Programming (www.dfanning.com)
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

and the like. I'm nice, but I'm not crazy. :-)