Paper 027-31

Improve Your Dating: The INTNX Function Alignment Value SAMEDAY

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INTRODUCTION

The data step function INTNX returns a SAS ® date value incremented by a specified number of intervals (days, weeks, months, quarters, years, etc.). INTNX's optional fourth argument determines how the SAS date is aligned before it is incremented. Alignment defaults to "beginning", so intnx('year','20nov2002'd,-1) first aligns to January 1, 2002 (the beginning of the interval, year), then subtracts one year, and the unexpected result is the SAS date value for January 1, 2001.

Version 8 alignment values were "beginning", "middle", and "end", so you could not preserve alignment with INTNX (e.g., subtract one year from November 20, 2002 and get November 20, 2001). Various less straightforward coding methods that preserved alignment have been discussed in conference papers and the SAS-L Internet newsgroup.

In Version 9, a new alignment value was added: "sameday", which preserves the SAS date value's alignment within the interval before it is incremented. intnx('year','20nov2002'd,-1,"sameday") is the SAS date value for November 20, 2001. This paper illustrates the use of "sameday", including interesting cases such as one year and four years after February 29, 2000 and one month before March 31, 2003 and March 31, 2004.

INTNX SYNTAX

In this section, the syntax of INTNX is reviewed somewhat informally and incompletely. For example, information is provided for SAS date values, but not for datetime and time values, and sub-arguments to the interval value are omitted. For complete syntax, see the *SAS 9.1.3 Language Reference: Dictionary, Volumes 1, 2, and 3*.

INTNX has three required arguments and one optional argument, commonly used as follows for SAS date values.

INTNX(*interval*, *start-from*, *increment* <,*alignment*>);

- *interval* is the unit of measure (days, weeks, months, quarters, years, etc.) by which *start-from* is incremented.

- *start-from* is a SAS date value to be incremented.

- *increment* is the integer number of intervals by which *start-from* is incremented (negative values = earlier dates).

- *alignment* is where *start-from* is aligned within *interval* prior to being incremented. Possible values are "beginning", "middle", "end", and (new in Version 9) "sameday". The default value is "beginning".

INTNX IN VERSION 8

INTNX's default *alignment* is "beginning", so by default *start-from* is aligned to the beginning of the period before being incremented. This leads to unexpected results for intervals other than day, as in the second and third examples.

1. intnx('day','20nov2002'd,-7); to increment the date by -7 days (seven days earlier).

   SAS subtracts seven days from 15,664, the SAS date value for November 20, 2002. The result is 15,657, the SAS date value for November 13, 2002, as expected.

2. intnx('month','20nov2002'd,1); to increment the date by one month. The expected result is 15,694, the SAS date value for December 20, 2002.

   SAS first aligns to November 1, 2002 (the beginning of the interval, month), then increments by one month. The result is 15,675, the SAS date value for December 1, 2002.

3. intnx('year','20nov2002'd,-1); to increment the date by -1 year (one year earlier). The expected result is 15,299, the SAS date value for November 20, 2001.

   SAS first aligns to January 1, 2002 (the beginning of the interval, year), then subtracts one year. The result is 14,976, the SAS date value for January 1, 2001.

Specifying *alignment* as "middle" or "end" does not yield the desired result. Gilsen (2003) has a simple solution for year intervals. Whitlock (1999) has a generalized macro that handles various intervals. Other solutions have been presented in conference papers and on the SAS-L Internet newsgroup. No solution is as simple as INTNX.

INTNX IN VERSION 9: "SAMEDAY" ALIGNMENT ADDED

In Version 9, a new alignment value, "sameday", was added. "sameday" preserves the SAS date value's alignment within the interval before it is incremented, generating the expected results, as in the following examples. Note that 2000 and 2004 but not 2003 are leap years.

```
SAS Statement                              Description             Result  SAS date value
intnx('day','20nov2002'd,-7,"sameday");    7 days before 11/20/02   15657   November 13, 2002
intnx('month','20nov2002'd,1,"sameday");   1 month after 11/20/02   15694   December 20, 2002
intnx('year','20nov2002'd,-1,"sameday");   1 year before 11/20/02   15299   November 20, 2001

intnx('year','29feb2000'd,1,"sameday");    1 year after 2/29/00     15034   February 28, 2001
intnx('year','29feb2000'd,4,"sameday");    4 years after 2/29/00    16130   February 29, 2004
intnx('month','31mar2003'd,-1,"sameday");  1 month before 3/31/03   15764   February 28, 2003
intnx('month','31mar2004'd,-1,"sameday");  1 month before 3/31/04   16130    February 29, 2004
```

CONCLUSION

This paper demonstrated the "sameday" alignment value, a Version 9 enhancement to the data step function INTNX that makes it easier to increment SAS date values.

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REFERENCES

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TRADEMARK INFORMATION