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SAS Date, Time, and Datetime Values

Definitions

SAS date value
is a value that represents the number of days between January 1, 1960, and a specified date. SAS can perform calculations on dates ranging from A.D. 1582 to A.D. 19,900. Dates before January 1, 1960, are negative numbers; dates after are positive numbers.

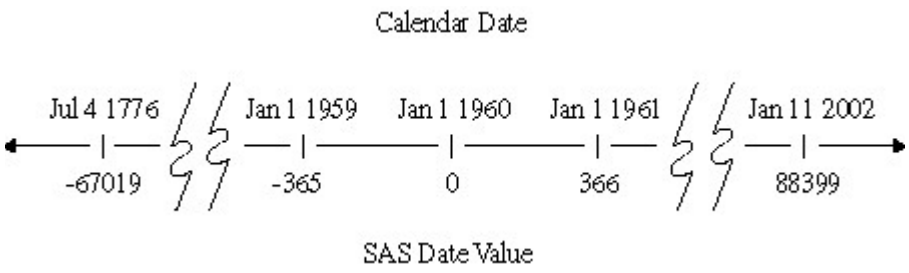
- SAS date values account for all leap year days, including the leap year day in the year 2000.
- SAS date values can reliably tell you what day of the week a particular day fell on as far back as September 1752, when the calendar was adjusted by dropping several days. SAS day-of-the-week and length-of-time calculations are accurate in the future to A.D. 19,900.
- Various SAS language elements handle SAS date values: functions, formats and informats.

SAS time value
is a value representing the number of seconds since midnight of the current day. SAS time values are between 0 and 86400.

SAS datetime value
is a value representing the number of seconds between January 1, 1960 and an hour/minute/second within a specified date.

The following figure shows some dates written in calendar form and as SAS date values.

How SAS Converts Calendar Dates to SAS Date Values



Two-Digit and Four-Digit Years

SAS software can read two-digit or four-digit year values. If SAS encounters a two-digit year, the YEARCUTOFF= option can be used to specify which century within a 100 year span the two-digit year should be attributed to. For example, YEARCUTOFF=1950 means that two-digit years 50 through 99 correspond to 1950 through 1999, while two-digit years 00 through 49 correspond to 2000 through 2049. Note that while the default value of the YEARCUTOFF= option in Version 8 of the SAS System is 1920, you can adjust the YEARCUTOFF= value in a DATA step to accomodate the range of date values you are working with at the moment. To correctly handle 2-digit years representing dates between 2000 and 2099, you should specify an appropriate YEARCUTOFF= value between 1901 and 2000. See the How to Read Two-Digit Years Using YEARCUTOFF= section for more information on the YEARCUTOFF= system option.

The Year 2000

SAS software treats the year 2000 like any other leap year. If you use two-digit year numbers for dates, you'll probably need to adjust the default setting for the YEARCUTOFF= option to work with date ranges for your data, or switch to four-digit years. The following program changes the YEARCUTOFF= value to 1950. This change means that all two digit dates are now assumed to fall in the 100-year span from 1950 to 2049.

```
options yearcutoff=1950;
data _null_;
   a='26oct02'd;
   put 'SAS date='a;
   put 'formatted date='a date9.;
run;
```

The PUT statement writes the following lines to the SAS log:

```
SAS date=15639
formated date=26OCT2002
```

Note: Whenever possible, specify a year using all four digits. Most SAS date and time language elements support four digit year values. ■

Working with SAS Dates and Times

Informats and Formats

The SAS System converts date, time and datetime values back and forth between calendar dates and clock times with SAS language elements called **formats** and **informats**.

- Formats present a value, recognized by SAS, such as a time or date value, as a calendar date or clock time in a variety of lengths and notations.
- Informats read notations or a value, such as a clock time or a calendar date, which may be in a variety of lengths, and then convert the data to a SAS date, time, or datetime value.

Date and Time Tools by Task

The following table correlates tasks with various SAS System language elements that are available for working with time and date data.

Tasks with Dates and Times, Part 1

To do this ...	Use this ...	List	Input	Result
Write SAS date values in recognizable forms	Date formats	DATE**w.**	14686	17MAR00
		DATE9.	14686	17MAR2000a
		DAY**w.**	14686	17
		DDMMYY**w.**	14686	17/03/00
		DDMMYY10.	14686	17/03/2000
		DDMMYYB**w.**	14686	17 03 00
		DDMMYYB10.	14686	17 03 2000
		DDMMYYC**w.**	14686	17:03:20
		DDMMYYC10.	14686	17:03:2000
		DDMMYYD**w.**	14686	17-03-00
		DDMMYYD10.	14686	17-03-2000
		DDMMYYN**w.**	14686	17MAR00
		DDMMYYN10	14686	17MAR2000
		DDMMYYP**w.**	14686	17.03.00
		DDMMYYP10.	14686	17.03.2000
		DDMMYYS**w.**	14686	17/03/00
		DDMMYYS10.	14686	17/03/2000
		DOWNAME.	14686	Friday
		EURDFDE**w.**	14686	17MAR00
		EURDFDE9.	14686	17MAR2000
		EURDFDN**w.**	14686	5
		EURDFDWN**w.**	14686	Friday

		EURDFMY**w.**	14686	MAR00
		EURDFDMY7	14686	MAR2000
		EURDFWDX**w.**	14686	17MAR2000
		EURDFMNw.	14686	March
		EURDFWKX**w.**	14686	Friday, 17 MAR 2000
		JULDAY**w.**	14686	77
		JULIAN**w.**	14686	00077
		MINGUO**w.**	14686	89/03/17
		MINGUO10.	14686	0089/03/17
		MMDDYY**w.**	14686	03/17/00
		MMDDYY10.	14686	03/17/2000
		MMDDYYB**w.**	14686	03 17 00
		MMDDYYB10.**w.**	14686	03 17 2000
		MMDDYYC**w.**	14686	03:17:00
		MMDDYYC10	14686	03:17:2000
		MMDDYYD**w.**	14686	03-17-00
		MMDDYYD10.	14686	03-17-2000
		MMDDYYN**w.**	14686	031700
		MMDDYYN10.	14686	03172000
		MMDDYYP	14686	03.17.00
		MMDDYYP10.	14686	03.17.2000
		MMDDYYS	14686	03/17/00
		MMDDYYS10.	14686	03/17/2000
		MMYY.**xw.**	14686	03M2000
		MMYYC**w.**	14686	03:2000
		MMYYD.	14686	03-2000
		MMYYN.	14686	032000
		MMYYP.	14686	03.2000

		MMYYS.	14686	03/2000
		MONNAME.	14686	March
		MONTH.	14686	3
		MONYY.	14686	MAR2000
		NENGO.	14686	H.12/03/17
		PDJULG**w.**	14686	2000077F
		PDJULI**w.**	14686	0100077F
		QTR**w.**	14686	1
		QTRR**w.**	14686	I
		TIME**w.d**	14686	4:04:46
		TIMEAMPM**w.d**	14686	4:04:46 AM
		TOD	14686	4:04:46
		WEEKDATE**w.**	14686	Friday, March 17, 2000
		WEEKDAY**w.**	14686	6
		WORDDATE.**w.**	14686	March 17, 2000
		WORDDATX**w.**	14686	17 MARCH 2000
		YEAR**w.**	14686	2000
		YYMM**w.**	14686	2000M03
		YYMMC**w.**	14686	2000:03
		YYMMDD**w.**	14686	2000-03
		YYMMP**w.**	14686	2000.03
		YYMMS.	14686	2000/03
		YYMMN.	14686	200003
		YYMMDD**w.**	14686	00-03-17
		YYMON.	14686	2000MAR
		YYQ**x**w.	14686	2000Q1
		YYQC**w.**	14686	2000:1
		YYQD**w.**	14686	2000-1

		YYQP**w.**	14686	2000.1
		YYQS**w.**	14686	2000/1
		YYQN**w.**	14686	20001
		YYQR**w.**	14686	2000QI
		YYQRC**w.**	14686	2000:I
		YYQRD**w.**	14686	2000-I
		YYQRP**w.w.**	14686	2000.I
		YYQRS**w.**	14686	2000/I
		YYQRN**w.**	14686	III

Tasks with Dates and Times, Part 2

To do this ...	Use this ...	List	Input	Result
Date Tasks				
Read calendar dates as SAS date Note: YEARCUTOFF=1920	Date informats	DATE**w.**	17MAR2000	-14534
		DATE9.	17MAR2000	14686
		DDMMYY**w.**	170300	14686
		DDMMYY8.	17032000	14686
		JULIAN**w.**	0077	14686
		JULIAN7.	2000077	14686
		MMDDYY**w.**	031700	14686
		MMDDYY10.	03172000	14686
		MONYY**w.**	MAR00	14670
		NENGO**w.**	H.12/03/17	14686
		YYMMDD**w.**	000317	14686
		YYMMDD10.	20000317	14686
		YYQ**w.**	00Q1	14610
		DATEJUL	2000077	14686

Create date values from pieces	Date functions			
		DHMS	'17MAR2000'D, 00,00,00	14686
		HMS	14,45,32	53132
		MDY	03,17,00	14686
		MDY	03,17,2000	14686
		YYQ	00,1	14610
Extract a date from a datetime value	Date functions	DATEPART	'17MAR00:00:00 'DT	14686
Return today's date as a SAS date	Date functions	DATE() or TODAY() (equivalent)	( )	SAS date for today
Extract calendar dates from SAS	Date functions	DAY	14686	17
		HOUR	14686	4
		JULDATE	14686	0077
		JULDATE7	14686	2000077
		MINUTE	14686	4
		MONTH	14686	3
		QTR	14686	3
		SECOND	14686	46
		WEEKDAY	14686	6
		YEAR	14686	2000
Write a date as a constant in an expression	SAS date constant	**'ddmmmyy'**d or **'ddmmmyyyy'**	`'17mar00'd` `'17mar2000'd`	14686
		SYSDATE	&SYSDATE	

Write today's date as a string	SYSDATE automatic macro variable			Date at time of SAS initialization in DDMMMYY
	SYSDATE9	SYSDATE9	&SYSDATE9	Date at time of SAS initialization in DDMMMYYYY
Time Tasks				
Write SAS time values as time values	time formats	HHMM.	53132	14:46
		HOUR.	53132	15
		MMSS.	53132	885
		TIME.	53132	14:45:32
		TOD.	53132	14:45:32
Read time values as SAS time values	Time informats	TIME	14:45:32	53132
Write the current time as a string	SYSTIME automatic macro variable	SYSTIME	&SYSTIME	Time at moment of execution in HH:MM
Return the current time of day as a SAS time value	Time functions	TIME( )	( )	SAS time value at moment of execution in NNNNN.NN
Return the time part of a SAS datetime value	Time functions	TIMEPART	SAS datetime value in NNNNNNNNNN.N	SAS time value part of date value in NNNNN.NN
Datetime Tasks				
Write SAS datetime values as datetime values	Datetime formats	DATEAMPM	1217083532	26JUL98:02:45 PM
		DATETIME	1268870400	17MAR00:00:00 :00
		EURDFDT	1217083532	26JUL98:14:45:32
Read datetime values as SAS datetime values	Datetime informats	DATETIME	17MAR00:00:00:00	1268870400

Return the current date and time of day as a SAS datetime value	Datetime functions	DATETIME()	()	SAS datetime value at moment of execution in NNNNNNNNNN.N
Interval Tasks				
Return the number of specified time intervals that lie between the two date or datetime values	Interval functions	INTCK	week 2 01aug60 01jan01	1055
Advances a date, time, or datetime value by a given interval, and returns a date, time, or datetime value	Interval functions	INTNX	day 14086 01jan60	14086

The SAS System also supports international formats and informats that are equivalent to some of the most commonly used English-language date formats and informats. For details, see "SAS Formats" and "SAS Informats."

Examples

Example 1: Displaying Date, Time, and Datetime Values as Recognizable Dates and Times

The following example demonstrates how a value may be displayed as a date, a time, or a datetime. Remember to select the SAS language element that converts a SAS date, time, or datetime value to the intended date, time or datetime format. See the previous tables for examples.

Note:

- Time formats count the number of seconds within a day, so the values will be between 0 and 86400.
- DATETIME formats count the number of seconds since January 1, 1960, so for datetimes that are greater than 02JAN1960:00:00:01, (integer of 86401) the datetime value will always be greater than the time value.
- When in doubt, look at the contents of your data set for clues as to which type of value you are dealing with.

This program uses the DATETIME, DATE and TIMEAMPM formats to display the value 86399 to a date and time, a calendar date, and a time.

```
data test;
options nodate pageno=1 linesize=80 pagesize=60;
Time1=86399;
format Time1 datetime.;
Date1=86399;
format Date1 date.;
Time2=86399;
format Time2 timeampm.;
run;
proc print data=test;
title  'Same Number, Different SAS Values';
footnote1 'Time1 is a SAS DATETIME value';
footnote2 'Date1 is a SAS DATE value';
footnote3 'Time2 is a SAS TIME value'.;
run;
```

Datetime, Date and Time Values for 86399

```
                        Same Number, Different SAS Values               1

                Obs          Time1            Date1         Time2

                 1      01JAN60:23:59:59    20JUL96    11:59:59 PM


                           Time1 is a SAS DATETIME value
                             Date1 is a SAS DATE value
                             Time2 is a SAS TIME value.
```

Example 2: Reading, Writing, and Calculating Date Values

This program reads four regional meeting dates and calculates the dates on which announcements should be mailed.

```
data meeting;
options nodate pageno=1 linesize=80 pagesize=60;
   input region $ mtg : mmddyy8.;
   sendmail=mtg-45;
   datalines;
N  11-24-99
S  12-28-99
E  12-03-99
W  10-04-99
;

proc print data=meeting;
   format mtg sendmail date9.;
   title 'When To Send Announcements';
run;
```

Calculated Date Values: When to Send Mail

```
                            When To Send Announcements
```

```
Obs    region          mtg      sendmail

 1       N        24NOV1999    10OCT1999
 2       S        28DEC1999    13NOV1999
 3       E        03DEC1999    19OCT1999
 4       W        04OCT1999    20AUG1999
```

International Date, Time and Datetime Formats

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