For many new SAS programmers, SAS date variables are often a source of confusion. Let’s look at some examples of how SAS stores date variables and then how they can be displayed and manipulated.

Let’s look at a calendar for the month of October.

### SAS Dates

- **Data:***
  - ```data _null_;
    date '01jan2012'd;
    put date7.;
    run;```

- **Display:***
  - ```01Jan12```

- **Internal Representation:***
  - `%julian(date, date7.)` returns `19181`

- **SAS Datetime Representation:***
  - `2012-07-01 00:00:00` (not case sensitive)

- **Date/Time Interval:***
  - `7 days` is represented as `7d`

- **Boundary Conditions:***
  - ```date '01jul2012'd;
    put date7.;
    run;```

- SAS absorbs the date “Today” and changes the date as 1 day later

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today</td>
<td></td>
<td>Date</td>
</tr>
<tr>
<td>Today</td>
<td></td>
<td>SAS Date</td>
</tr>
<tr>
<td>Today</td>
<td></td>
<td>Data</td>
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<tr>
<td>Today</td>
<td></td>
<td>Internal</td>
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<tr>
<td>Today</td>
<td></td>
<td>SAS Time</td>
</tr>
<tr>
<td>Today</td>
<td></td>
<td>SAS Datetime</td>
</tr>
</tbody>
</table>

### What is Missing?

- The day before this is 30, 31, or 32 (before December)

- Today goes before the date for the next day.

### Pope Gregory XIII in the Papal bull

- **Letter grailinasim:***

- Reformatted the calendar giving us what is known as the Gregorian Calendar.

- **This replaced the Julian Calendar which had been in effect since 45 BC.**

- **Why?**

  - Eastern could not be properly determined.

### SAS Formats

- **Internal Representation:***
  - `%julian(date, date7.)` returns `19181`

- **Display:***
  - ```01Jan12```

- **SAS Datetime Representation:***
  - `2012-07-01 00:00:00` (not case sensitive)

- **Date/Time Interval:***
  - `7 days` is represented as `7d`

- **Boundary Conditions:***
  - ```date '01jul2012'd;
    put date7.;
    run;```

- SAS absorbs the date “Today” and changes the date as 1 day later

### SAS Datetime

- **Data:***
  - ```data _null_;
    today = '7Jul12:00:00';
    date7. = today;
    put today date7.;
    run;```

- **Display:***
  - ```07JUL12:00:00```

- **Internal Representation:***
  - `%julian(date, date7.)` returns `19181`

- **SAS Datetime Representation:***
  - `2012-07-01 00:00:00` (not case sensitive)

- **Date/Time Interval:***
  - `7 days` is represented as `7d`

- **Boundary Conditions:***
  - ```date '01jul2012'd;
    put date7.;
    run;```

- SAS absorbs the date “Today” and changes the date as 1 day later

### SAS Functions

- **SAS Functions continue.**

### Display/Start

- **SAS Data Time:***
  - `Today = '7Jul12:00:00';`

- **Display:***
  - ```07JUL12:00:00```

- **Internal Representation:***
  - `%julian(date, date7.)` returns `19181`

- **SAS Datetime Representation:***
  - `2012-07-01 00:00:00` (not case sensitive)

- **Date/Time Interval:***
  - `7 days` is represented as `7d`

- **Boundary Conditions:***
  - ```date '01jul2012'd;
    put date7.;
    run;```

- SAS absorbs the date “Today” and changes the date as 1 day later

### Where does the time go?

- **SAS Functions continue.**

### SAS Times

- **Data:***
  - ```data _null_;
    date = '7Jul12:00:00';
    date7. = date;
    put date time();
    run;```

- **Display:***
  - ```07JUL12:00:00
  00:00:00```

- **Internal Representation:***
  - `%julian(date, date7.)` returns `19181`

- **SAS Datetime Representation:***
  - `2012-07-01 00:00:00` (not case sensitive)

- **Date/Time Interval:***
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- **Boundary Conditions:***
  - ```date '01jul2012'd;
    put date7.;
    run;```

- SAS absorbs the date “Today” and changes the date as 1 day later

### intck() and intnx() Intervals

- **Data:***
  - ```data _null_;
    date = '7Jul12:00:00';
    date7. = date;
    put date time();
    run;```

- **Display:***
  - ```07JUL12:00:00
  00:00:00```

- **Internal Representation:***
  - `%julian(date, date7.)` returns `19181`

- **SAS Datetime Representation:***
  - `2012-07-01 00:00:00` (not case sensitive)

- **Date/Time Interval:***
  - `7 days` is represented as `7d`

- **Boundary Conditions:***
  - ```date '01jul2012'd;
    put date7.;
    run;```

- SAS absorbs the date “Today” and changes the date as 1 day later
Why Does the Bell Toll 108 Times?

There was a system set up for striking the bell for time announcements; this usually called for 19 fast strikes, 15 slow strikes, and 10 strikes which were "held" for 7 seconds. This sequence was repeated two times, making a total of 108 strikes. Then why should there be 168 strikes? This was because 168 times represented one year to the ancient Chinese. It was recorded in the "Manuscript of Seven Categories" made during the Ming Dynasty when 168 times of striking the bell was equivalent to one year. As there were twelve months, there were 208 times (72 times for each month, and 44 times for holidays in the holidays system). Five days were called a Hou, and 12 Hou were made in a month, so there were 810 times. Two persons in one year, therefore, the number 108 occurred according to those times.

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Time is the thing that keeps everything from happening at once.