



# Sometimes one needs an option with unusual dates

Arthur Tabachneck  
Thornhill, Ontario

*art297*

Matthew Kastin  
Louisville, Colorado

*FriedEgg*

Xia Ke Shan  
Beijing, China

*XSharp*

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April 22-25, 2012

**Not all dates are directly covered  
by the SAS *interval* and *holiday* functions**

**e.g., some fiscal years in Great Britain**

<b>06APR2011</b>	← beginning of fiscal year
<b>06JUL2011</b>	← start of the 2 <sup>nd</sup> quarter
<b>06OCT2011</b>	← start of the 3 <sup>rd</sup> quarter
<b>06JAN2011</b>	← start of the 4 <sup>th</sup> quarter
<b>05APR2012</b>	← end of fiscal year

# SAS interval functions weren't designed to work (directly) with dates and holidays from:

- periods that don't start at the beginning, middle or end of a given month
- non-Gregorian calendars like:
  - the Hebrew calendar
  - the Islamic calendar
  - the Chinese Agricultural calendar
- annual sporting events
- annual company or charity campaigns



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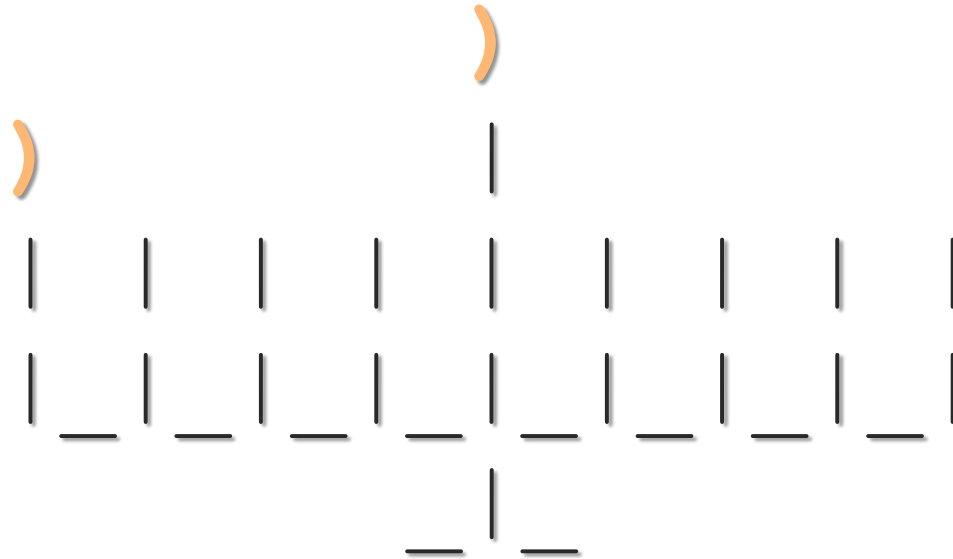
**but you might need the functions to:**

**send emails on particular holidays**  
**conduct analyses on changes over time**  
**exclude certain dates from analyses**  
**analyze effects related to annual events**  
**build a scheduling system**

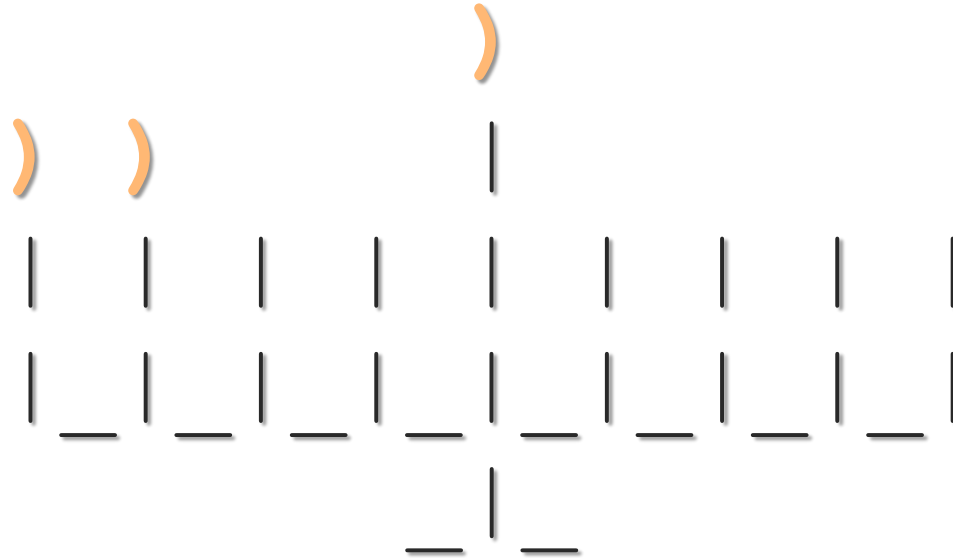


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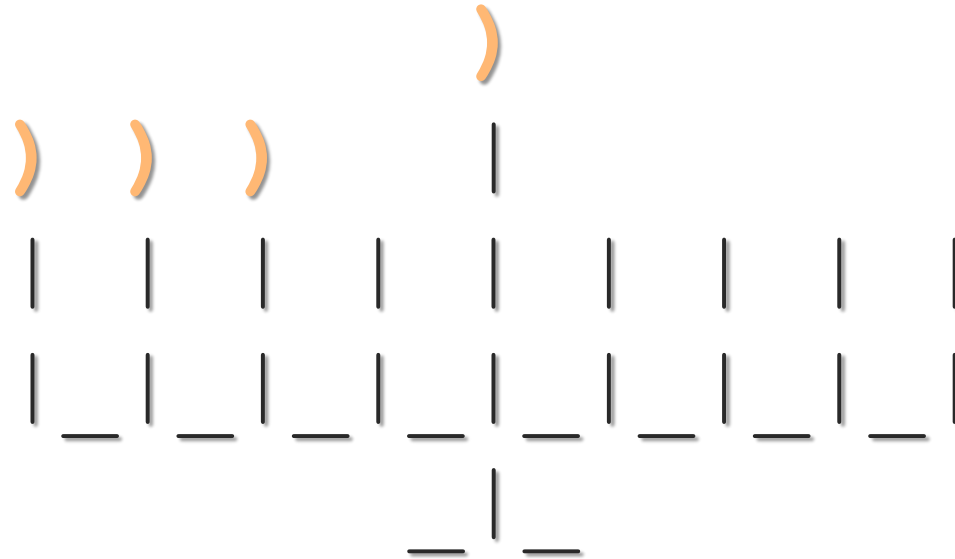
Wouldn't it be nice to be able to automatically email a correct Chanukah greeting on the right days?



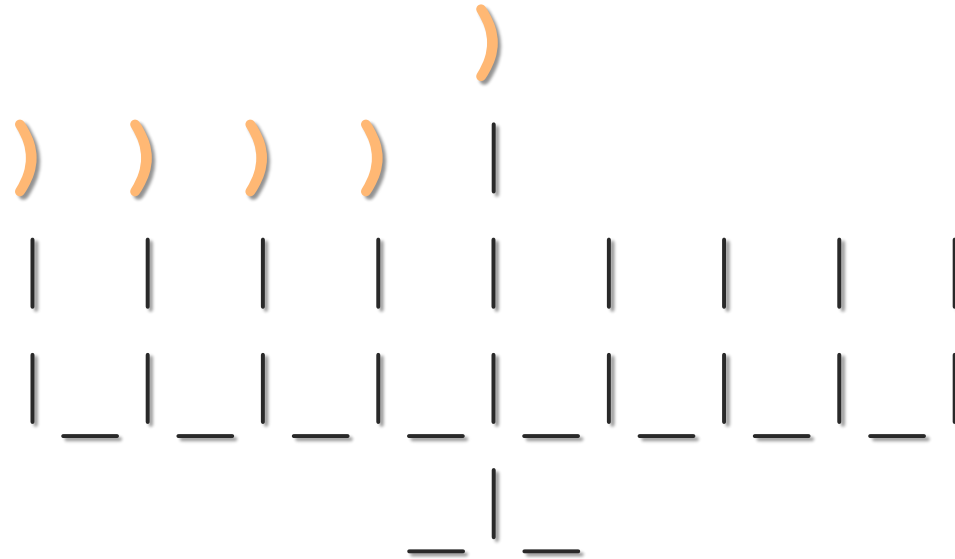
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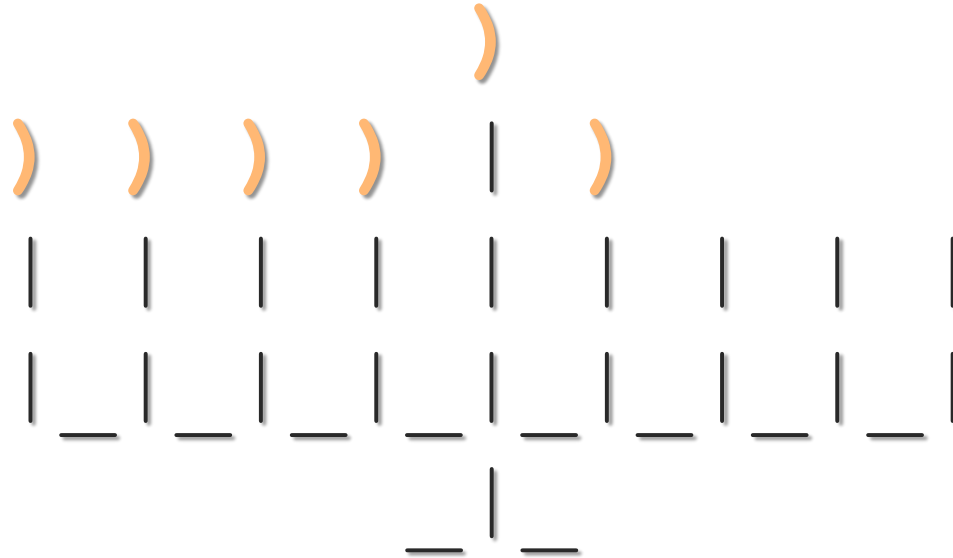


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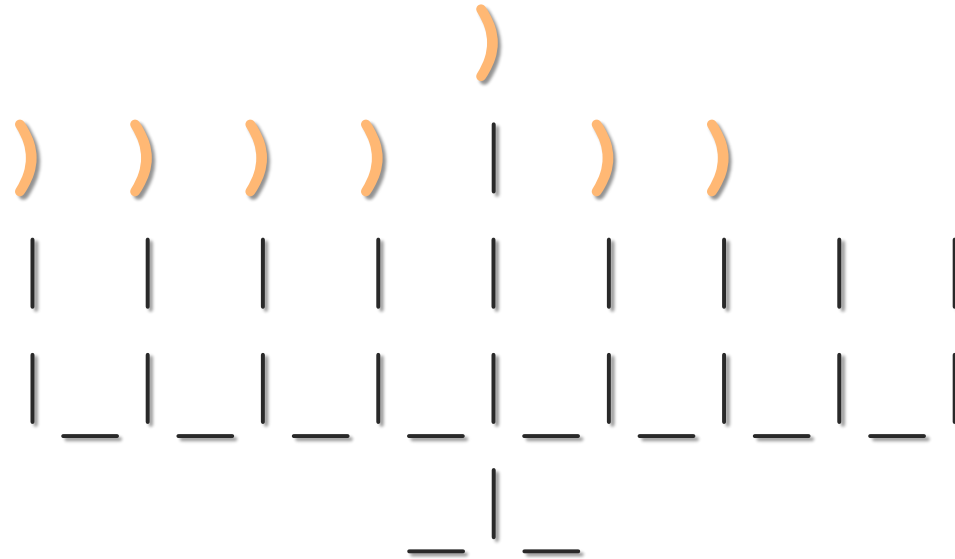




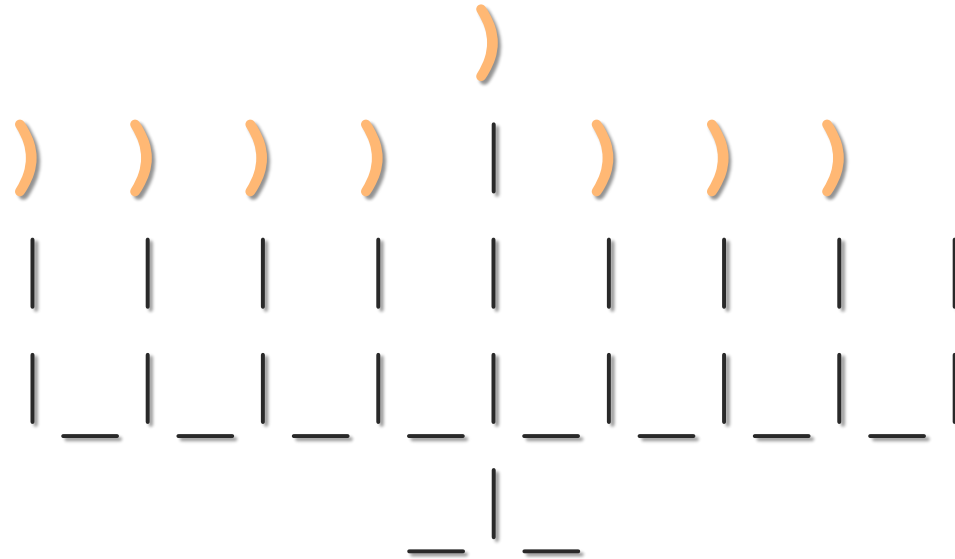
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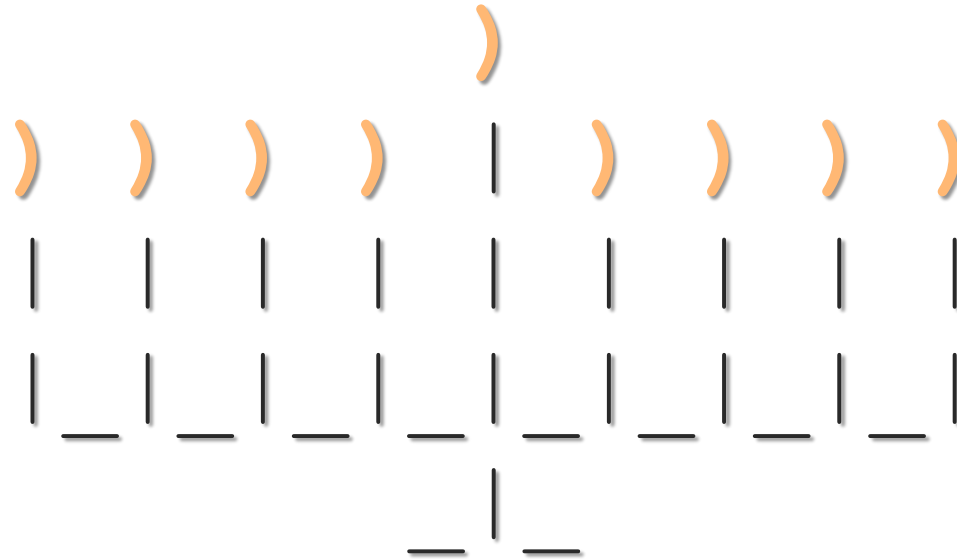
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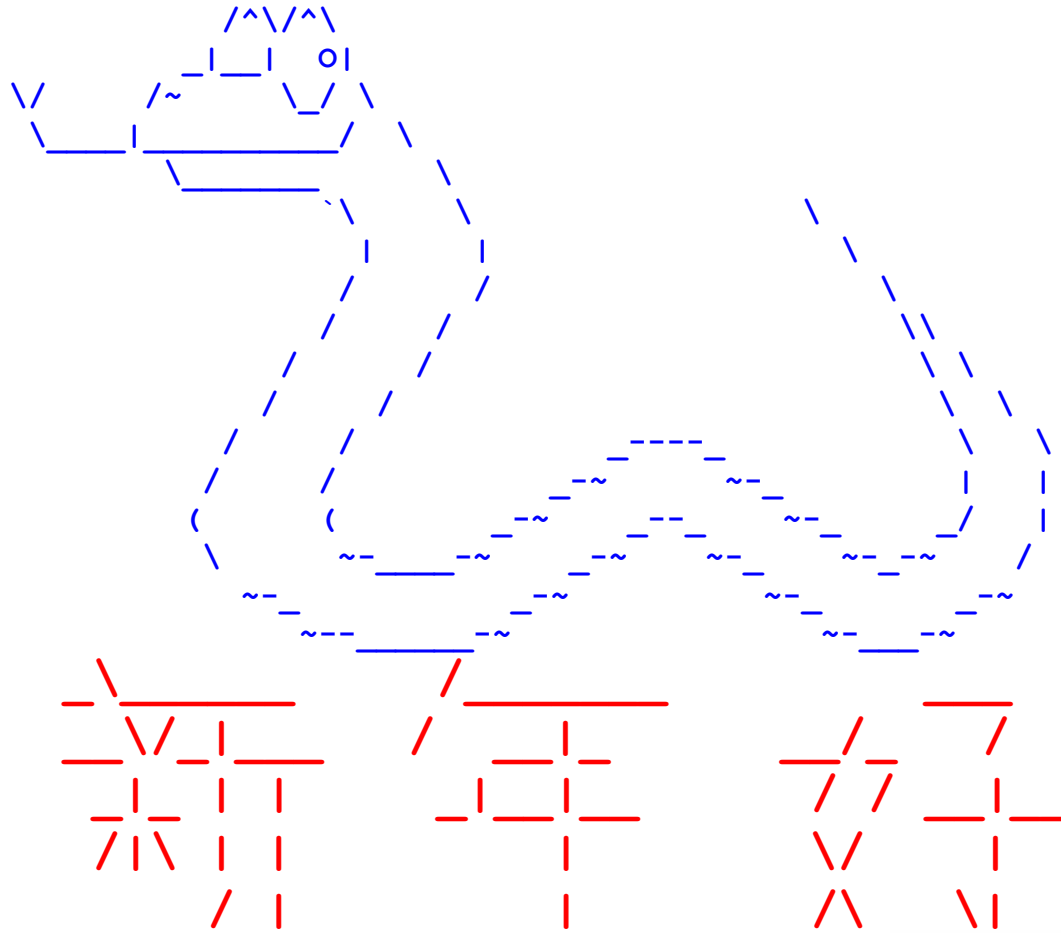
Wouldn't it be nice to be able to automatically email a correct Chanukah greeting on the right days?



Wouldn't it be nice to be able to automatically email a correct Chanukah greeting on the right days?



or automatically email Chinese New Year greetings?



# Step 1: Create interval datasets

```
data fyds fqds fmds;
do begin= '06APR1900'd to '05APR2100'd;
  if day(begin) eq 6 then do;
    mbeg=month(begin);
    season=max(mbeg-3,(mbeg<4)*(mbeg+9));
    end=intnx('month', begin, 1, 'same')-1;  output fmds;
  if mbeg eq 4 then do;
    season=year(begin);
    end=intnx('year', begin, 1, 'same')-1;  output fyds;
  end;
  if mbeg in (4,7,10,1) then do;
    season=max(round(mbeg/4,1),(mbeg<4)*4);
    end=intnx('month', begin, 3, 'same')-1;  output fqds;
  end;
end;
end;
format begin end date.;
run;
```



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## Step 2: Apply the *intervals* System Option

```
options intervals=( FiscalQuarter=FQDS  
FiscalMonth=FMDS  
FiscalYear=FYDS );
```

for example data we'll use the date field from  
the 1<sup>st</sup> 12 records of the sashelp.pricedata dataset

date

01JAN98  
05APR99  
01FEB98  
01MAR98  
01APR98  
01MAY98  
01JUN98  
01JUL98  
01AUG98  
01SEP98  
01OCT98  
01NOV98  
01DEC98



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## Step 3: Use any desired interval function(s)

data want;

```
set sashelp.pricedata (keep=date obs=12);  
format date date9.;  
fiscal_year=intindex( 'FiscalYear', date );  
fiscal_qtr=intindex( 'FiscalQuarter', date );  
fiscal_month=intindex( 'FiscalMonth', date );  
next_year_start=intnx('FiscalYear',date,1,'b');  
next_year_middle=intnx('FiscalYear',date,1,'m');  
next_year_end=intnx('FiscalYear',date,1,'e');  
format date next: date9.;
```

run;

**/\*Note: You can also use other interval functions\*/**



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next_year_start=intnx('FiscalYear',date,1,'b');  
next_year_middle=intnx('FiscalYear',date,1,'m');  
next_year_end=intnx('FiscalYear',date,1,'e');  
format date next: date9.;
```

run;

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format date next: date9.;
```

run;

**/\*Note: You can also use other interval functions\*/**



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which will produce:

*intindex( 'FiscalYear', date )*

date	fiscal_year	fiscal_order	fiscal_start	next_year_start	next_year_middle	next_year_end
<b>01JAN98</b>	<b>1997</b>	5	9	06APR98	05OCT98	05APR99
01FEB98	1997	4	10	06APR98	05OCT98	05APR99
01MAR98	1997	4	11	06APR98	05OCT98	05APR99
01APR98	1997	4	12	06APR98	05OCT98	05APR99
01MAY98	1998	1	1	06APR99	05OCT99	05APR00
01JUN98	1998	1	2	06APR99	05OCT99	05APR00
01JUL98	1998	1	3	06APR99	05OCT99	05APR00
01AUG98	1998	2	4	06APR99	05OCT99	05APR00
01SEP98	1998	2	5	06APR99	05OCT99	05APR00
01OCT98	1998	2	6	06APR99	05OCT99	05APR00
01NOV98	1998	3	7	06APR99	05OCT99	05APR00
01DEC98	1998	3	8	06APR99	05OCT99	05APR00



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# which will produce:

date	fiscal_year	fiscal_qtr	fiscal_month	next_year	next_year	next_year
01JAN98	1997	3	1	06APR98	05OCT98	05APR99
01FEB98	1997	4	10	06APR98	05OCT98	05APR99
01MAR98	1997	4	11	06APR98	05OCT98	05APR99
01APR98	1997	4	12	06APR98	05OCT98	05APR99
01MAY98	1998	1	1	06APR99	05OCT99	05APR00
01JUN98	1998	1	2	06APR99	05OCT99	05APR00
01JUL98	1998	1	3	06APR99	05OCT99	05APR00
01AUG98	1998	2	4	06APR99	05OCT99	05APR00
01SEP98	1998	2	5	06APR99	05OCT99	05APR00
01OCT98	1998	2	6	06APR99	05OCT99	05APR00
01NOV98	1998	3	7	06APR99	05OCT99	05APR00
01DEC98	1998	3	8	06APR99	05OCT99	05APR00

**intindex('FiscalQuarter', date) ear**



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which will produce:

*intindex( 'FiscalMonth', date )*

date	fiscal _year	fiscal _qtr	fiscal month	next _year	next_year _middle	next_year _end
<b>01JAN98</b>	1997	3	9	06APR98	05OCT98	05APR99
01FEB98	1997	4	10	06APR98	05OCT98	05APR99
01MAR98	1997	4	11	06APR98	05OCT98	05APR99
01APR98	1997	4	12	06APR98	05OCT98	05APR99
01MAY98	1998	1	1	06APR99	05OCT99	05APR00
01JUN98	1998	1	2	06APR99	05OCT99	05APR00
01JUL98	1998	1	3	06APR99	05OCT99	05APR00
01AUG98	1998	2	4	06APR99	05OCT99	05APR00
01SEP98	1998	2	5	06APR99	05OCT99	05APR00
01OCT98	1998	2	6	06APR99	05OCT99	05APR00
01NOV98	1998	3	7	06APR99	05OCT99	05APR00
01DEC98	1998	3	8	06APR99	05OCT99	05APR00



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which will produce:

*intnx('FiscalYear', date, 1, 'b')*

date	_year	_month	fiscal_year	next_year_start	next_year_middle	next_year_end
<b>01JAN98</b>	1997	3	3	<b>06APR98</b>	05OCT98	05APR99
01FEB98	1997	4	10	06APR98	05OCT98	05APR99
01MAR98	1997	4	11	06APR98	05OCT98	05APR99
01APR98	1997	4	12	06APR98	05OCT98	05APR99
01MAY98	1998	1	1	06APR99	05OCT99	05APR00
01JUN98	1998	1	2	06APR99	05OCT99	05APR00
01JUL98	1998	1	3	06APR99	05OCT99	05APR00
01AUG98	1998	2	4	06APR99	05OCT99	05APR00
01SEP98	1998	2	5	06APR99	05OCT99	05APR00
01OCT98	1998	2	6	06APR99	05OCT99	05APR00
01NOV98	1998	3	7	06APR99	05OCT99	05APR00
01DEC98	1998	3	8	06APR99	05OCT99	05APR00



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which will produce:

*intnx('FiscalYear', date, 1, 'm')* →

date	fiscal_year	fiscal_qtr	month	next_year	next_year_middle	next_year_end
<b>01JAN98</b>	1997	3	9	<b>06APR98</b>	<b>05OCT98</b>	<b>05APR99</b>
01FEB98	1997	4	10	06APR98	05OCT98	05APR99
01MAR98	1997	4	11	06APR98	05OCT98	05APR99
01APR98	1997	4	12	06APR98	05OCT98	05APR99
01MAY98	1998	1	1	06APR99	05OCT99	05APR00
01JUN98	1998	1	2	06APR99	05OCT99	05APR00
01JUL98	1998	1	3	06APR99	05OCT99	05APR00
01AUG98	1998	2	4	06APR99	05OCT99	05APR00
01SEP98	1998	2	5	06APR99	05OCT99	05APR00
01OCT98	1998	2	6	06APR99	05OCT99	05APR00
01NOV98	1998	3	7	06APR99	05OCT99	05APR00
01DEC98	1998	3	8	06APR99	05OCT99	05APR00



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will produce:

intnx('FiscalYear', date, 1, 'e')

date	fiscal_year	fiscal_qtr	fiscal_month	next_year_start	next_year_end
<b>01JAN98</b>	1997	3	9	06APR98	05OCT98 → <b>05APR99</b>
01FEB98	1997	4	10	06APR98	05OCT98
01MAR98	1997	4	11	06APR98	05OCT98
01APR98	1997	4	12	06APR98	05OCT98
01MAY98	1998	1	1	06APR99	05OCT99
01JUN98	1998	1	2	06APR99	05OCT99
01JUL98	1998	1	3	06APR99	05OCT99
01AUG98	1998	2	4	06APR99	05OCT99
01SEP98	1998	2	5	06APR99	05OCT99
01OCT98	1998	2	6	06APR99	05OCT99
01NOV98	1998	3	7	06APR99	05OCT99
01DEC98	1998	3	8	06APR99	05OCT99



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the most difficult part, for non-Gregorian-based calendars, is creating the interval datasets

our paper includes code that creates the datasets for:

- British fiscal years
- the Hebrew calendar
- the Islamic calendar
- the Chinese Agricultural calendar
- the NCAA March Madness tournament



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and the paper includes code that creates an expanded holiday function, called **holiday\_x**, that includes:

- all holidays from the holiday function
- all Islamic holidays
- all Jewish holidays
- additional US and Canadian holidays
- a number of spelling variants of all holidays
- and can be easily expanded to include any other holidays desired/needed

All of the code and this Powerpoint can be found at:

[http://www.sascommunity.org/wiki/  
Sometimes\\_One\\_Needs\\_an\\_Option\\_with\\_Unusual\\_Dates](http://www.sascommunity.org/wiki/Sometimes_One_Needs_an_Option_with_Unusual_Dates)



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## The code includes examples of how to:

- create functions using PROC FCMP
- use the hash method to create lookup tables
- import data from web sites
- create and use INTERVALDS datasets
- automatically create formats from data files
- create and send holiday email greetings

**Your comments and questions  
are valued and encouraged**



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## **Contact the Authors**

**Arthur Tabachneck, Ph.D.  
myQNA, Inc., Thornhill, ON  
e-mail: [art297@rogers.com](mailto:art297@rogers.com)**

**Matthew Kastin  
i-behavior, Inc., Louisville, CO  
email: [matthew.kastin@gmail.com](mailto:matthew.kastin@gmail.com)**

**Xia Ke Shan  
Chinese Financial Electrical Company  
Beijing, China  
email: [xiakeshan@yahoo.com.cn](mailto:xiakeshan@yahoo.com.cn)**

