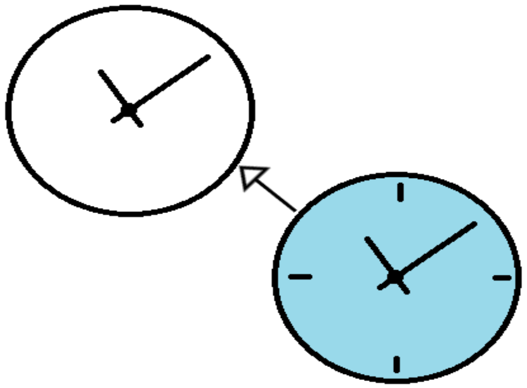
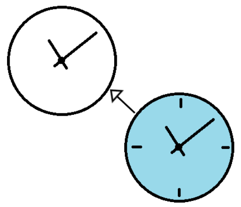


Subclassing the ooRexx dateTime class

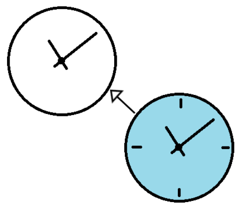
Jon Wolfers

History



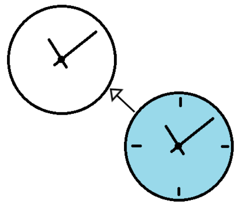
- 2001 – Using ooRexx with APS Paypoint 6 till
- Dates in the format dd/mm/yyyy
  - Wrote a function to convert them to standard date, probably:
  - `return changeStr('/',translate('1234567890',arg(1),'9086751234'),'-')`
- Later: dateTime class was added to ooRexx

dateTime class

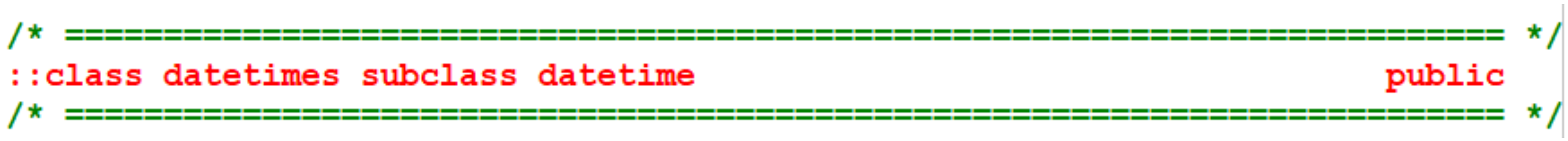


- Represents a point in time
- Can be created from the standard rexx date and time string representations
- Can present itself as the standard rexx date and time string representations
- Is immutable
- Can take part in date/time arithmetic

Subclassing



- Primarily thought of as way to specialise
- Allows use of all methods of superclass
- Allows over-riding for specialisation
- Allows adding new methods to extend

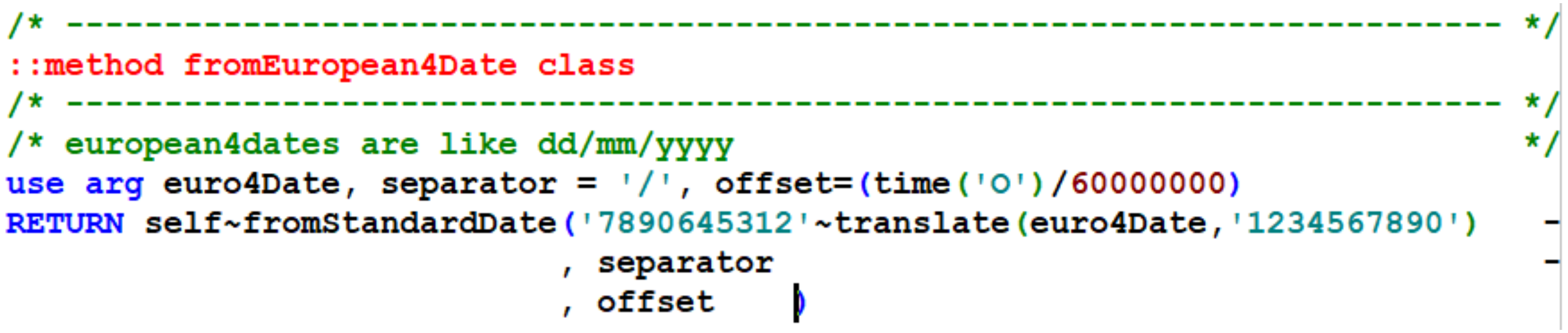


```
/* ========================================================================= */
::class datetimes subclass datetime                                   public
/* ========================================================================= */
```

- datetimes is a sub-class of datetime

Adding a constructor for european4date

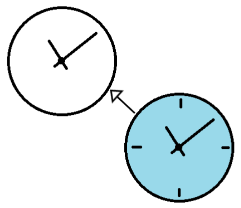
- Constructor is a class method for creating an instance



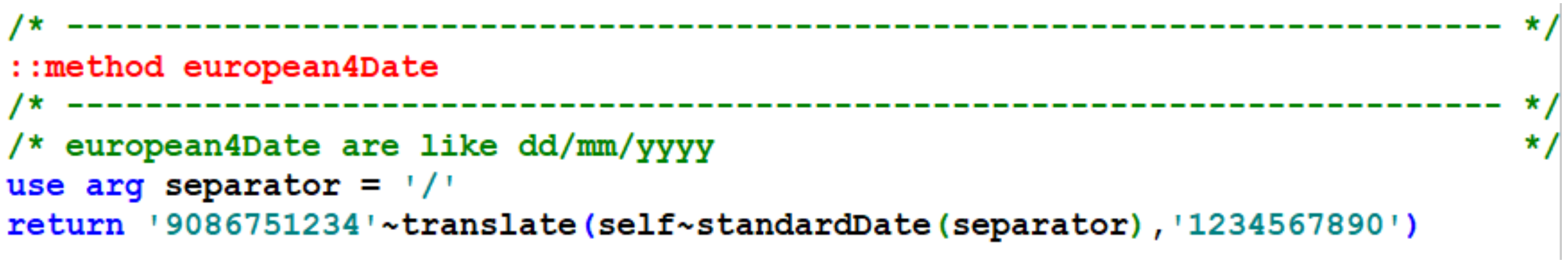
```
/* ---------------------------------------------------------------------- */
::method fromEuropean4Date class
/* ---------------------------------------------------------------------- */
/* european4dates are like dd/mm/yyyy                                     */
use arg euro4Date, separator = '/', offset=(time('O')/60000000)
RETURN self~fromStandardDate('7890645312'~translate(euro4Date,'1234567890')   -
                            , separator                                       -
                            , offset    )
```

- `myDatetimes = .datetimes~fromEuropean4date('22/09/2019')`

Providing a toString method for european4date



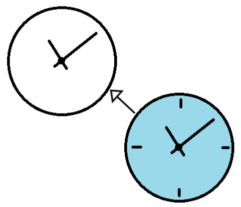
- This is an instance method for creating a string representation



```
/* ------------------------------------------------------------------ */
::method european4Date
/* ------------------------------------------------------------------ */
/* european4Date are like dd/mm/yyyy                                  */
use arg separator = '/'
return '9086751234'~translate(self~standardDate(separator),'1234567890')
```

- That's it – 3 directives & 4 lines of code and datetime is extended to handle a new format.

Immutability and the subclass



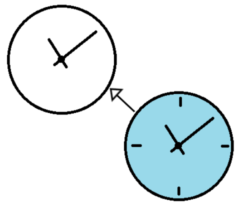
```
  a = .datetime~new
  b = .datetimes~new

  c = a~addDays(1)
  d = b~addDays(1)                  -- addDays is a method of the superclass

  say 'c is an instance of' c~class -- c is an instance of The DateTime class
  say 'd is an instance of' d~class -- d is an instance of The DATETIMES class

::requires 'datetimes.cls'
```

Converting a datetime to a datetimes instance

- Datetimes has access to all methods of datetime, but not vica versa
- fromDateTime allows one to create a datetimes from a datetime

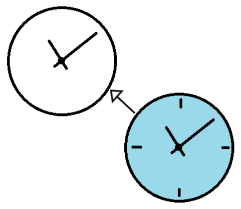
```
   a = .datetime~fromstandardDate('2019-01-01','-')
   b = .datetimes~fromDatetime(a)
   say b~class b~european4Date      -- returns The DATETIMES class 01/01/2019

::requires 'datetimes.cls'
```

Now we see how easy it is…



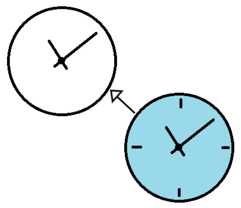
- datetime is specific about how an ISO datetime should be formatted, so is MySql
    - yyyy-mm-ddThh:mm:ss.uuuuuu
    - yyyy-mm-dd hh:mm:ss
- USA date and Ordered date

Now let’s generalise it



- Imagine a universal constructor method ‘**from**’ that you told what format to accept
- And a universal toString method ‘**to**’ that would build the output to your format

Format strings

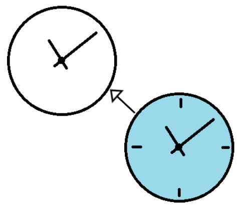


- ooDialog already has a class that uses date/time format strings as defined by Microsoft
- For our purposes we need some new ones…

Format strings not included in ooDialog documentation

D	The day followed by suffix - ie 9th
q	The quarter number (1 – 4)
s	The one- or two-digit seconds *
ss	The two-digit seconds *
f	Fraction of a second (symbol chosen by Rick McGuire)
*	Not documented in ooDialog but used in underlying control
	Full list of format strings in help document

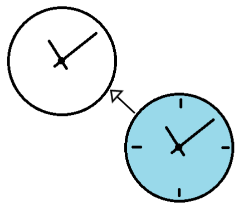
Escape characters



- Literals (for example separators) may be included in the format string
- Where a literal is used that is defined as a format string – it must be escaped
- The escape character is chosen by programmer to be unique within the format string

Some Examples

Period start and finish

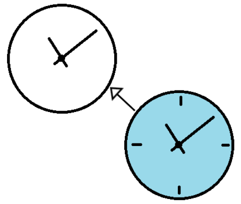


- Reporting often requires date/time calculations to find start and end of periods
- Add '**startOf**' and '**endOf**' methods
- Period may be offset from current period

Minute	Hour
Day	Week
Month	Quarter
Year	Decade
Century	Millennium

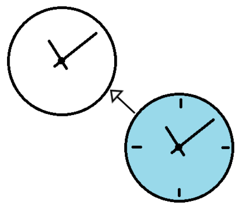
Some Examples

Coordinated Universal Time



- UTC (Coordinated Universal Time) recognises time zones
- Times include an offset of hours and minutes from GMT
- FromUTCdate constructor accepts an offset yyyy-mm-ddThh:mm:ss.uuuuuu**+hhmm**
- All other datetime (and datetimes) constructors can accept an offset in minutes

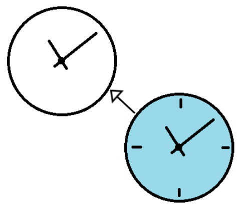
Summertime Blues



- dateTime provides a method toLocalTime which returns an instance representing the local time
- BUT it doesn't work across daylight savings boundaries
- The EU provide an algorithm for DS boundary dates (US does too, but it is different)
- toLocalTimeEU works across DS boundarys

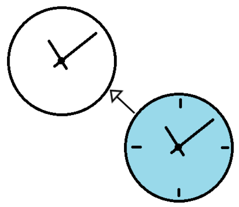
An example

A Bonus

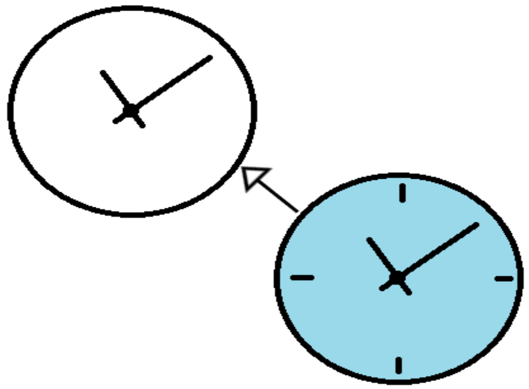


- Working out daylight savings boundaries required finding the last Sunday in the month
- I provided a general method nthWeekdayOfMonth to work out 1st, 2nd , last… Occurrence of a particular day in the month referred to be a datetimes instance

Where can I get this?



- Datetimes.cls is in my sandbox on the ooRexx site
- …BUT…
- Since I started work on this Rick has built much of the new functionality shown here into the language. Coding is done, but not yet documentation.



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The End