Messages: Composition and Precedence

Damien Cassou, Stéphane Ducasse and Luc Fabresse

http://www.pharo.org
Composition: from Left to Right!

What happens when we have two messages of the same kind?

- Execution from left to right

1000 factorial class name
> 'LargePositiveInteger'

is equivalent to

```
(((1000 factorial) class) name)
```

- Ease the composition of messages
Complete Message Precedence

- (Msg) > Unary > Binary > Keywords
- From left to right
Precedence Example

2 + 3 squared
> 2 + 9
> 11

- unary (squared) first
- then binary (+)
Precedence Example

- 2 raisedTo: 3 + 2
- > 2 raisedTo: 5
- > 32

- binary (+) first
- then keyword-based (raisedTo:)
Precedence Example

- Color gray = Color white = Color black
- aGray = aWhite = aBlack
- aBlack = aBlack
- true

- unary messages
- then binary from left to right
Precedence Example

1 class maxVal + 1
> 1152921504606846976

- unary, unary and binary

1 class
> SmallInteger

1 class maxVal
> 1152921504606846975

1 class maxVal + 1
> 1152921504606846976

(1 class maxVal + 1) class
> LargePositiveInteger
Parentheses take Precedence!

0@0 extent: 100@100 bottomRight
> Message not understood
> 100 does not understand bottomRight

Should use ()

(0@0 extent: 100@100) bottomRight
> (aPoint extent: anotherPoint) bottomRight
> aRectangle bottomRight
> 100@100
The Price for Simplicity

Only messages:

- +
  - is a message, no precedence
  - can be redefined in domain classes

- Simple

- One limit: no mathematical precedence
No Mathematical Precedence

\[ 3 + 2 \times 10 > 5 \times 10 > 50 \]

- should be rewritten using parentheses

\[ 3 + (2 \times 10) > 3 + 20 > 23 \]
No Mathematical Precedence

\[ \frac{1}{3} + \frac{2}{3} > \frac{7}{3} \div \frac{3}{3} > \frac{7}{9} \]

- should be rewritten using parentheses

\[ (\frac{1}{3}) + (\frac{2}{3}) > \frac{1}{3} \]
Summary

- Three kinds of messages: unary, binary and keywords
- (...) > unary > binary > keywords
- Then from left to right
- There is no mathematical precedence because mathematical operations are plain messages
- Arguments are placed inside message structure:
  - 2 between: 0 and: 5 (the message is between:and:)