

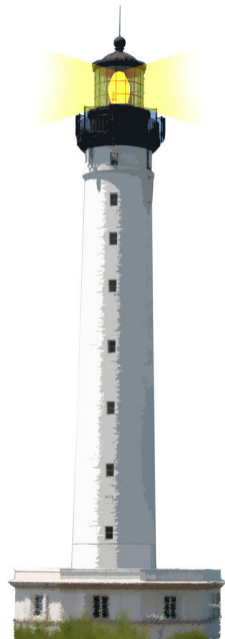
Messages: Composition and Precedence

Damien Cassou, Stéphane Ducasse and Luc Fabresse

W2S03



<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

$3 + 2 * 10$
 $> 5 * 10$
 > 50

- should be rewritten using parentheses

$3 + (2 * 10)$
 $> 3 + 20$
 > 23



No Mathematical Precedence

$$\begin{aligned} &1/3 + 2/3 \\ &> 7/3 / 3 \\ &> 7/9 \end{aligned}$$

- should be rewritten using parentheses

$$\begin{aligned} &(1/3) + (2/3) \\ &> 1 \end{aligned}$$

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:)



A course by



and



in collaboration with



Inria 2020

Except where otherwise noted, this work is licensed under CC BY-NC-ND 3.0 France

<https://creativecommons.org/licenses/by-nc-nd/3.0/fr/>