2. Objects and Expressions

This lesson is about reading and understanding Smalltalk expressions, and differentiating between different types of messages and receivers.

Please read Chapters 2-4 of the *Pharo by Example* book.

Use a fresh pharo1.0-10451-BETAweb09.09.3 image to answer all questions.

Note that in some exercises we ask you to read and evaluate some expressions without using the Smalltalk environment. You can assume that the implementation of methods generally corresponds to what their message names imply (i.e., 2 + 2 = 4).

Exercise 2.1: Simple Expressions

Here are three simple Smalltalk expressions:

1. 3 + 4

2. Date today

3. anArray at: 1 put: 'hello'

4. 25@50

Answer the following questions for each of the expressions:

- What is the receiver object?
- What is the message selector?
- What is/are the argument (s)?
- What is the result returned by evaluating this expression?

Exercise 2.2: Some Questions

Answer the following questions:

- What kind of object do these literal expressions describe:

  1. 'Hello, Dave'
  2. #Node1
  3. #(1 2 3)

- Examine the following code:

  ```
  | anArray |
  anArray := #('first' 'second' 'third' 'fourth').
  ^anArray at: 2
  ```

  What is the resulting value when it is evaluated?

Exercise 2.3:

- Some parentheses are redundant with regard to evaluation of the following expressions:

  1. ((3 + 4) + (2 * 2) + (2 * 3))
  2. (x isZero) ifTrue: [....].
     (x includes: y) ifTrue: [....].

  Write down equivalent expressions with the minimal number of parentheses.

- Guess what are the results of the following expressions

  6 + 4 / 2
  1 + 3 negated
  1 + (3 negated)
  2 raisedTo: 3 + 2
  2 negated raisedTo: 3 + 2

Exercise 2.4:

- Examine the following expression and write down the sequence of steps that the Smalltalk system would take to execute the following expressions:

  1. Date today daysInMonth
  2. #(1 2 3) size + 7
  3. 5@5 extent: 6.0 truncated @ 7

  Here is an example:

  Smalltalk allClasses size

  1. send message allClasses to the global Smalltalk. Result: some object.
  2. send message size to the result from step 1.

- During lecture, we saw how to write strings to the Transcript, and how the message `printString` could be sent to any non-string object to obtain a string representation. Now write a Smalltalk expression to print the result of `34 + 89` on the Transcript.

Please send your solutions by email to st-staff@iam.unibe.ch until the beginning of the next ST exercise session (12:00 noon). Your solutions should be clearly marked with names and immatriculation numbers of all team members (max. two people).