

RailsOnLisp

Thomas de Grivel thoxdg@gmail.com

<http://kmx.io>

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Common Lisp

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Introduction

Common Lisp

Common Lisp is the programmable programming language.

Lisp essays by Paul Graham

<http://www.paulgraham.com/lisp.html>

Standardised in 1994 by ANSI

Common Lisp the Language, 2nd Edition

<https://www.cs.cmu.edu/Groups/AI/html/cltl/cltl2.html>

Common Lisp Hyperspec

<http://www.lispworks.com/documentation/HyperSpec/Front/>

Cliki

<http://cliki.net>

Common Lisp

De nombreux compilateurs respectant le standard ANSI existent :

- SBCL (open-source, x86, amd64, Windows, Linux, OSX, *BSD)
<http://sbcl.org>
- ABCL (open-source, jvm)
<https://abcl.org>
- Clozure CL (open-source, x86, amd64, Windows, Linux, OSX, FreeBSD)
<https://ccl.clozure.com>
- ECL (open-source, transpile en C)
<https://common-lisp.net/project/ecl/main.html>
- LispWorks (proprietary, x86, amd64, Windows, Linux, OSX, FreeBSD)
<http://www.lispworks.com/products/lispworks.html#personal>
- Allegro CL (proprietary, x86, amd64, sparc, Windows, Linux, OSX, FreeBSD)
<https://franz.com/products/allegrocl>

Common Lisp Installation

Installer SBCL

Ubuntu :

```
sudo apt-get install sbcl
```

MacOS X :

```
brew install sbcl
```

Installer repo

```
mkdir -p ~/common-lisp/thodg  
cd ~/common-lisp/thodg  
git clone https://github.com/thodg/repo.git  
cd ~/common-lisp  
ln -s thodg/repo/repo.manifest
```


Configurer SBCL

Éditer ~/.sbclrc

```
;; ASDF
(require :asdf)

;; repo
(load "~/common-lisp/thodg/repo/repo")
(repo:boot)
```

Lancer SBCL

```
$ sbcl
```

This is SBCL 1.5.3, an implementation of ANSI Common Lisp.

More information about SBCL is available at [<http://www.sbcl.org/>](http://www.sbcl.org/).

SBCL is free software, provided as is, with absolutely no warranty. It is mostly in the public domain; some portions are provided under BSD-style licenses. See the CREDITS and COPYING files in the distribution for more information.

```
* _
```

Installer Slime

```
* (repo:install :slime)
```

```
$ /usr/bin/git -C /home/dx/common-lisp/slime clone https://github.com/slime/slime  
Cloning into 'slime'...
```

Configurer emacs

Éditer ~/.emacs

```
;; Common Lisp
(add-to-list 'load-path "~/common-lisp/slime/slime/")
(require 'slime-autoloads)
(add-to-list 'slime-contribs 'slime-fancy)
(setq inferior-lisp-program
      "sbcl")
(setq slime-net-coding-system
      'utf-8-unix)
```

Common Lisp

Demo

Lancer emacs et slime

```
$ emacs
```

```
M-x slime
```

```
CL-USER> _
```

La REPL

REPL : read, eval, print loop

```
(loop
  ;; setup REPL vars
  ;; handle errors, interactive debugger
  (print
    (eval
      (read)))
  (force-output)) ;; flush output buffers
```

Les symboles

Un symbole est plus rapide à comparer qu'une chaîne de caractères (comparaison de pointeurs). Pour récupérer un symbole à travers `eval` il faut le quoter en le préfixant d'une apostrophe.

```
;; SLIME
```

```
CL-USER> 'hello-world
```

```
HELLO WORLD
```

```
CL-USER> (quote hello-world) ; equivalent sans syntaxe
```

```
HELLO WORLD
```

<http://www.gigamonkeys.com/book/programming-in-the-large-packages-and-symbols.html>

Les symboles

Si on ne quote pas le symbole on tombe dans le debugger interactif.

```
;; SLIME  
CL-USER> hello-world
```

The variable HELLO-WORLD is unbound.
[Condition of type UNBOUND-VARIABLE]

Restarts:

- 0: [CONTINUE] Retry using HELLO-WORLD.
- 1: [USE-VALUE] Use specified value.
- 2: [STORE-VALUE] Set specified value and use it.
- 3: [RETRY] Retry SLIME REPL evaluation request.
- 4: [*ABORT] Return to SLIME's top level.

Backtrace:

- 0: (SB-INT:SIMPLE-EVAL-IN-LEXENV HELLO-WORLD #<NULL-LEXENV>)
 - 1: (EVAL HELLO-WORLD)
- more--

```
4  
; Evaluation aborted on #<UNBOUND-VARIABLE HELLO-WORLD {1004AF3523}>.  
CL-USER> _
```

Les fonctions

Pour définir une fonction on utilise `defun`. Si le premier élément d'une liste (entre parenthèses) est une fonction ou un symbole nommant une fonction alors c'est un appel de fonction.

```
;; SLIME
CL-USER> (defun hello-world ()
           (format t "Hello world !"))
HELLO-WORLD
CL-USER> (hello-world)
Hello world !
NIL
CL-USER> _
```

Lambda

Une fonction anonyme est introduite par `lambda`. On peut affecter une fonction anonyme à un symbole, reproduisant l'effet de `defun`.

```
;; SLIME  
CL-USER> (setf (symbol-function 'hello-world)  
               (lambda ()  
                 (format t "Hello world !"))))
```

```
CL-USER> (hello-world)  
Hello world !  
NIL  
CL-USER> _
```

Les fonctions d'ordre supérieur

Une fonction est une valeur comme une autre et peut être passée en paramètre d'une autre fonction. On appelle ces fonctions les fonctions d'ordre supérieur.

```
;; SLIME
CL-USER> (mapcar (lambda (x) (* x x)) '(1 2 3 4 5))
(1 4 9 16 25)
CL-USER> (reduce #'(1 2 3 4 5))
15
CL-USER> (reduce (function +) '(1 2 3 4 5))
15
CL-USER> (reduce '+ '(1 2 3 4 5))
15
CL-USER> _
```

Les macros

- paramètres non évalués \Rightarrow DSL et meta-programmation
- génère du code qui est à son tour évalué
- backquote et virgule pour quoter partiellement

```
;; SLIME
CL-USER> (defmacro hello (arg)
           `(format nil "Hello ~A !"
                     (string-capitalize ',arg)))

HELLO
CL-USER> (hello world)
"Hello World !"
CL-USER> (hello poney)
"Hello Poney !"
CL-USER> _
```

On Lisp, Paul Graham

<http://lib.store.yahoo.net/lib/paulgraham/onlisp.pdf>

La quasiquote

- Pour quoter entièrement : `'(a b c)` ou `(quote (a b c))`
⇒ `(a b c)`
- Pour quoter partiellement : ``(a b ,c)` ou `(list 'a 'b c)`
⇒ `(a b 123)` si `c = 123`

Backquote arrête l'évaluation et virgule la réactive localement.

```
;; SLIME  
CL-USER> (let ((c 123))  
           `(a b ,c))  
(A B 123)
```

RailsOnLisp

RailsOnLisp

Installation

Cloner RailsOnLisp/rol.git

```
$ mkdir ~/common-lisp/RailsOnLisp
$ cd ~/common-lisp/RailsOnLisp
$ git clone https://github.com/RailsOnLisp/rol.git
Cloning into 'rol' ...

$ _
```

Configurer le PATH

Éditer ~/.profile

```
if [ -d "$HOME/common-lisp/RailsOnLisp/rol/bin" ]; then  
    PATH="$HOME/common-lisp/RailsOnLisp/rol/bin:$PATH"  
fi
```

Installer RailsOnLisp

```
$ . ~/.profile      # sourcer .profile ou lancer un nouveau shell
$ rol install
Cloning into 'rol-assets' ...
Cloning into 'rol-files' ...
Cloning into 'rol-log' ...
Cloning into 'rol-server' ...
Cloning into 'rol-skel' ...
Cloning into 'rol-template' ...
Cloning into 'rol-uri' ...

$ ls -l ~/common-lisp/RailsOnLisp/rol

$ _
```

RailsOnLisp

Demo

rol new

```
$ rol new test
Creating test
D .
D ./config
F ./config/app.lisp
F ./config/routes.lisp
F ./config/assets.lisp
D ./data
D ./lib
L ./lib/rol -> /home/dx/common-lisp/RailsOnLisp/rol
F ./Makefile
D ./app
D ./app/assets
D ./app/assets/css
F ./app/assets/css/app.css
D ./app/assets/js
F ./app/assets/js/app.js
D ./app/views
D ./app/views/_layouts
[...]

$ _
```

make load

```
$ cd test
$ make load
env LC_ALL=en_US.UTF-8 sbcl --disable-ldb --lose-on-corruption \
  --dynamic-space-size 512 --noinform --end-runtime-options \
  --eval '(declaim (optimize (debug 2) (safety 2) (speed 3) (space 1)))' \
  --disable-debugger \
  --load load.lisp \
  --eval '(run)' \
  --quit

[...]
```

```
INFO setup environment development
DEBUG tags: ASSETS APP REPLY MIME FILE DIRECTORY THOT
INFO saving facts into "data/test.facts"
INFO starting thot at 0.0.0.0:4000

INFO Thot start 0.0.0.0:4000
INFO loading mime types from /etc/mime.types
INFO #<FUNCTION THOT::MAIN-LOOP-THREADED>
INFO #<FUNCTION THOT::ACCEPTOR-LOOP-EPOLL>
```

localhost :4000

