

**NAME**

clisp – [ANSI](#)<sup>[38]</sup> [Common Lisp](#)<sup>[1]</sup> compiler, interpreter and debugger.

**SYNOPSIS**

```
clisp [[-h] | [--help]] [--version] [--license] [--help-image] [-B lisp-lib-dir] [-b] [-K linking-set]
[-M mem-file] [-m memory-size] [-L language] [-N locale-dir] [-E domain encoding] [[-q] |
[--quiet] | [--silent] | [-v] | [--verbose]] [--on-error action] [-repl] [-w] [-I]
[-disable-readline] [[-ansi] | [-traditional]] [-modern] [-p package] [-C] [-norc]
[-lp directory...] [-i init-file...] [-c [-I] lisp-file [-o output-file...] [-x expressions...]
[lisp-file [argument...]]
```

**DESCRIPTION**

Invokes the [Common Lisp](#)<sup>[1]</sup> interpreter and compiler.

**Interactive Mode**

When called without batch arguments, executes the [read-eval-print loop](#)<sup>[2]</sup>, in which expressions are in turn

- [READ](#)<sup>[3]</sup> from the standard input,
- [EVAL](#)<sup>[4]</sup>uated by the lisp interpreter,
- and their results are [PRINT](#)<sup>[5]</sup>ed to the standard output.

**Non-Interactive (Batch) Mode**

Invoked with `-c`, compiles the specified lisp files to a platform-independent bytecode which can be executed more efficiently.

Invoked with `-x`, executes the specified lisp expressions.

Invoked with `lisp-file`, runs the specified lisp file.

**OPTIONS**

`-h`

`--help`

Displays a help message on how to invoke [CLISP](#)<sup>[6]</sup>.

`--version`

Displays the [CLISP](#)<sup>[6]</sup> version number, as given by the function [LISP-IMPLEMENTATION-VERSION](#)<sup>[7]</sup>, the value of the variable `*FEATURES*`, as well some other information.

`--license`

Displays a summary of the licensing information, the [GNU](#)<sup>[8]</sup> [GPL](#)<sup>[9]</sup>.

`--help-image`

Displays information about the memory image being invoked: whether is it suitable for scripting as well as the `:DOCUMENTATION` supplied to `EXT:SAVEINITMEM`.

`-B lisp-lib-dir`

Specifies the installation directory. This is the directory containing the linking sets and other data files. This option is normally not necessary, because the installation directory is already built-in into the `clisp` executable. Directory `lisp-lib-dir` can be changed dynamically using the [SYMBOL-MACRO](#)<sup>[10]</sup> `CUSTOM:*LIB-DIRECTORY*`.

`-b`

Print the installation directory and exit immediately. The namestring of `CUSTOM:*LIB-DIRECTORY*` is printed without any quotes. This is mostly useful in module Makefiles, see, e.g., `modules/syscalls/Makefile.in` (file in the CLISP sources).

`-K linking-set`

Specifies the linking set to be run. This is a directory (relative to the `lisp-lib-dir`) containing at least a main executable (runtime) and an initial memory image. Possible values are

`base`

the core **CLISP**<sup>[6]</sup>

### **full**

core plus all the modules with which this installation was built, see Section 32.2, “External Modules”.

The default is **base**.

### **-M mem-file**

Specifies the initial memory image. This must be a memory dump produced by the **EXT:SAVEINITMEM** function by this **clisp** runtime. It may have been compressed using **GNU**<sup>[8]</sup> **gzip**<sup>[11]</sup>.

### **-m memory-size**

Sets the amount of memory **CLISP**<sup>[6]</sup> tries to grab on startup. The amount may be given as

*n*

**nB**

measured in bytes

*n*

**nW**

measured in machine words ( $4 \times n$  on 32-bit platforms,  $8 \times n$  on 64-bit platforms)

**nK**

**nKB**

measured in kilobytes

**nKW**

measured in kilowords

**nM**

**nMB**

measured in megabytes

**nMW**

measured in megawords

The default is 3 megabytes. The argument is constrained above 100 KB.

This version of **CLISP**<sup>[6]</sup> allocates memory dynamically. *memory-size* is essentially ignored (except that it determines the Lisp STACK size).

### **-L language**

Specifies the language **CLISP**<sup>[6]</sup> uses to communicate with the user. This may be one of **english**, **german**, **french**, **spanish**, **dutch**, **russian**, **danish**. Other languages may be specified through the **environment variable**<sup>[12]</sup> **LANG**, provided the corresponding message catalog is installed. The language may be changed dynamically using the **SYMBOL-MACRO**<sup>[10]</sup> **CUSTOM:\*CURRENT-LANGUAGE\***.

### **-N locale-dir**

Specifies the base directory of locale files. **CLISP**<sup>[6]</sup> will search its message catalogs in *locale-dir/language/LC\_MESSAGES/clisp.mo*. This directory may be changed dynamically using the **SYMBOL-MACRO**<sup>[10]</sup> **CUSTOM:\*CURRENT-LANGUAGE\***.

### **-E domain encoding**

Specifies the encoding used for the given domain, overriding the default which depends on the **environment variable**<sup>[12]</sup> **LC\_ALL**, **LC\_CTYPE**, **LANG**. *domain* can be

**file**

affecting **CUSTOM:\*DEFAULT-FILE-ENCODING\***

**pathname**

affecting *CUSTOM: \*PATHNAME-ENCODING\**

#### **terminal**

affecting *CUSTOM: \*TERMINAL-ENCODING\**

#### **foreign**

affecting *CUSTOM: \*FOREIGN-ENCODING\**

#### **misc**

affecting *CUSTOM: \*MISC-ENCODING\**

#### *blank*

affecting all of the above.

### **Warning**

Note that the values of these **SYMBOL-MACRO**<sup>[10]</sup>s that have been saved in a memory image are ignored: these **SYMBOL-MACRO**<sup>[10]</sup>s are reset based on the OS environment **after** the memory image is loaded.

You have to use the RC file, *CUSTOM: \*INIT-HOOKS\** or *init* function to set them on startup, but it is best to set the aforementioned **environment variable**<sup>[12]</sup>s appropriately for consistency with other programs. See Section 31.1, “Customizing CLISP Process Initialization and Termination”.

#### **-q**

#### **--quiet**

#### **--silent**

#### **-v**

#### **--verbose**

Change verbosity level: by default, **CLISP**<sup>[6]</sup> displays a banner at startup and a good-bye message when quitting, and initializes *\*LOAD-VERBOSE\**<sup>[13]</sup> and *\*COMPILE-VERBOSE\**<sup>[14]</sup> to **T**<sup>[15]</sup>, and *\*LOAD-PRINT\**<sup>[13]</sup> and *\*COMPILE-PRINT\**<sup>[14]</sup> to **NIL**<sup>[16]</sup>, as per [ANSI CL standard]. The first **-q** removes the banner and the good-bye message, the second sets variables *\*LOAD-VERBOSE\**<sup>[13]</sup>, *\*COMPILE-VERBOSE\**<sup>[14]</sup> and *CUSTOM: \*SAVEINITMEM-VERBOSE\** to **NIL**<sup>[16]</sup>. The first **-v** sets variables *CUSTOM: \*REPORT-ERROR-PRINT-BACKTRACE\**, *\*LOAD-PRINT\**<sup>[13]</sup> and *\*COMPILE-PRINT\**<sup>[14]</sup> to **T**<sup>[15]</sup>, the second sets *CUSTOM: \*LOAD-ECHO\** to **T**<sup>[15]</sup>. These settings affect the output produced by **-i** and **-c** options. Note that these settings persist into the **read-eval-print loop**<sup>[2]</sup>. Repeated **-q** and **-v** cancel each other, e.g., **-q -q -v -v -v** is equivalent to **-v**.

#### **-on-error action**

Establish global error handlers, depending on *action*: PP appease

**continuable**<sup>[17]</sup> **ERROR**<sup>[18]</sup>s are turned into **WARNING**<sup>[19]</sup>s (with **EXT:APPEASE-CERRORS**) other **ERROR**<sup>[18]</sup>s are handled in the default way

#### *debug*

**ERROR**<sup>[18]</sup>s **INVOKE-DEBUGGER**<sup>[20]</sup> (the normal **read-eval-print loop**<sup>[2]</sup> behavior), disables batch mode imposed by **-c**, **-x**, and *lisp-file*,

#### *abort*

**continuable**<sup>[17]</sup> **ERROR**<sup>[18]</sup>s are appeased, other **ERROR**<sup>[18]</sup>s are **ABORT**<sup>[21]</sup>ed with **EXT:ABORT-ON-ERROR**

#### *exit*

**continuable**<sup>[17]</sup> **ERROR**<sup>[18]</sup>s are appeased, other **ERROR**<sup>[18]</sup>s terminate **CLISP**<sup>[6]</sup> with **EXT:EXIT-ON-ERROR** (the normal batch mode behavior).

See also **EXT:SET-GLOBAL-HANDLER**.

#### **-repl**

Start an interactive **read-eval-print loop**<sup>[2]</sup> after processing the **-c**, **-x**, and *lisp-file* options and on any **ERROR**<sup>[18]</sup> **SIGNAL**<sup>[22]</sup>ed during that processing.

Disables batch mode.

**-w**

Wait for a keypress after program termination.

**-I**

Interact better with [Emacs](#)<sup>[23]</sup> (useful when running [CLISP](#)<sup>[6]</sup> under [Emacs](#)<sup>[23]</sup> using [SLIME](#)<sup>[24]</sup>, [ILISP](#)<sup>[25]</sup> et al). With this option, [CLISP](#)<sup>[6]</sup> interacts in a way that [Emacs](#)<sup>[23]</sup> can deal with:

- unnecessary prompts are not suppressed.
- The [GNU](#)<sup>[8]</sup> [readline](#)<sup>[26]</sup> library treats TAB (see TAB key) as a normal self-inserting character (see Q: A.4.6).

**-disable-readline**

Do not use [GNU](#)<sup>[8]</sup> [readline](#)<sup>[26]</sup> even when it has been linked against. This can be used if one wants to paste non-[ASCII](#)<sup>[27]</sup> characters, or when [GNU](#)<sup>[8]</sup> [readline](#)<sup>[26]</sup> misbehaves due to installation (different versions on the build and install machines) or setup (bad [TERM environment variable](#)<sup>[12]</sup> value) issues.

**-ansi**

Comply with the [ANSI CL standard] specification even where [CLISP](#)<sup>[6]</sup> has been traditionally different by setting the [SYMBOL-MACRO](#)<sup>[10]</sup> [CUSTOM: \\*ANSI\\*](#) to [T](#)<sup>[15]</sup>.

**-traditional**

Traditional: reverses the residual effects of **-ansi** in the saved memory image.

**-modern**

Provides a modern view of symbols: at startup the [\\*PACKAGE\\*](#)<sup>[28]</sup> variable will be set to the “CS-COMMON-LISP-USER” package, and the [\\*PRINT-CASE\\*](#)<sup>[29]</sup> will be set to **:DOWNCASE**. This has the effect that symbol lookup is case-sensitive (except for keywords and old-style packages) and that keywords and uninterned symbols are printed with lower-case preference. See Section 11.5, “Package Case-Sensitivity”.

**-p package**

At startup the value of the variable [\\*PACKAGE\\*](#)<sup>[28]</sup> will be set to the package named *package*. The default is the value of [\\*PACKAGE\\*](#)<sup>[28]</sup> when the image was saved, normally **“COMMON-LISP-USER”**<sup>[30]</sup>.

**-C**

Compile when loading: at startup the value of the variable [CUSTOM: \\*LOAD-COMPILING\\*](#) will be set to [T](#)<sup>[15]</sup>. Code being [LOAD](#)<sup>[31]</sup>ed will then be [COMPILE](#)<sup>[32]</sup>d on the fly. This results in slower loading, but faster execution.

**-norc**

Normally [CLISP](#)<sup>[6]</sup> loads the user “run control” ([RC](#))<sup>[33]</sup> file on startup (this happens **after** the **-C** option is processed). The file loaded is .clisprc.lisp or .clisprc.fas in the home directory [USER-HOMEDIR-PATHNAME](#)<sup>[34]</sup>, whichever is newer. This option, **-norc**, prevents loading of the RC file.

**-lp directory**

Specifies directories to be added to [CUSTOM: \\*LOAD-PATHS\\*](#) at startup. This is done **after** loading the RC file (so that it does not override the command-line option) but **before** loading the init-files specified by the **-i** options (so that the init-files will be searched for in the specified directories). Several **-lp** options can be given; all the specified directories will be added.

**-i init-file**

Specifies initialization files to be [LOAD](#)<sup>[31]</sup>ed at startup. These should be lisp files (source or compiled). Several **-i** options can be given; all the specified files will be loaded in order.

**-c lisp-file**

Compiles the specified *lisp-files* to bytecode (\*.fas). The compiled files can then be [LOAD](#)<sup>[31]</sup>ed instead of the sources to gain efficiency.

Imposes batch mode.

**-o** *outputfile*

Specifies the output file or directory for the compilation of the last specified *lisp-file*.

**-l**

Produce a bytecode **DISASSEMBLE**<sup>[35]</sup> listing (\*.lis) of the files being compiled. Useful only for debugging. See Section 24.1, “Function COMPILE-FILE” for details.

**-x** *expressions*

Executes a series of arbitrary expressions instead of a **read-eval-print loop**<sup>[2]</sup>. The values of the expressions will be output to **\*STANDARD-OUTPUT\***<sup>[36]</sup>. Due to the argument processing done by the shell, the *expressions* must be enclosed in double quotes, and double quotes and backslashes must be escaped with backslashes.

Imposes batch mode.

*lisp-file* [ *argument* ... ]

Loads and executes a *lisp-file*, as described in Section 32.6.2, “Scripting with CLISP”. There will be no **read-eval-print loop**<sup>[2]</sup>. Before *lisp-file* is loaded, the variable **EXT: \*ARGS\*** will be bound to a list of strings, representing the *arguments*. The first line of *lisp-file* may start with **#!**, thus permitting **CLISP**<sup>[6]</sup> to be used as a script interpreter. If *lisp-file* is **-**, the **\*STANDARD-INPUT\***<sup>[36]</sup> is used instead of a file.

This option is *disabled* if the memory image was created by **EXT:SAVEINITMEM** with **NIL**<sup>[16]</sup> **:SCRIPT** argument. In that case the **LIST**<sup>[37]</sup> **EXT: \*ARGS\*** starts with *lisp-file*.

This option must be the last one.

No RC file will be executed.

Imposes batch mode.

As usual, **--** stops option processing and places all remaining command line arguments into **EXT: \*ARGS\***.

## LANGUAGE REFERENCE

The language implemented is **ANSI**<sup>[39]</sup><sup>[38]</sup> **Common Lisp**<sup>[1]</sup>. The implementation mostly conforms to the ANSI Common Lisp standard, see Section 31.10, “Maximum ANSI CL compliance”. [ANSI CL] ANSI CL standard 1994. **ANSI**<sup>[40]</sup> INCITS 226-1994 (R1999)

Information Technology - Programming Language - Common Lisp  
[formerly ANSI X3.226-1994 (R1999)].

## COMMAND LINE USER ENVIRONMENT

**help**

get context-sensitive on-line help, see Chapter 25, Environment chap-25.

**(APROPOS** *name*)

list the **SYMBOL**<sup>[41]</sup>s matching *name*.

**(DESCRIBE** *symbol*)

describe the *symbol*.

(exit)

(quit)

(bye)

quit **CLISP**<sup>[6]</sup>.

EOF (Control+D on **UNIX**<sup>[42]</sup>)

leave the current level of the **read-eval-print loop**<sup>[2]</sup> (see also Section 1.1, “Special Symbols sec\_1-4-1-3”).

arrow keys

for editing and viewing the input history, using the [GNU](#)<sup>[8]</sup> [readline](#)<sup>[26]</sup> library.

TAB key

Context sensitive:

- If you are in the “function position” (in the first symbol after an opening paren or in the first symbol after a [#'](#)<sup>[44]</sup>), the completion is limited to the symbols that name functions.
- If you are in the “filename position” (inside a string after [#P](#)<sup>[45]</sup>), the completion is done across file names, [GNU](#)<sup>[8]</sup> [bash](#)<sup>[46]</sup>–style.
- If you have not typed anything yet, you will get a help message, as if by the **help** command.
- If you have not started typing the next symbol (i.e., you are at a whitespace), the current function or macro is **DESCRIBED**.
- Otherwise, the symbol you are currently typing is completed.

## USING AND EXTENDING CLISP

**Common Lisp**<sup>[1]</sup> is a *programmable* programming language. —[John Foderaro](#)<sup>[47]</sup>.PP When **CLISP**<sup>[6]</sup> is invoked, the runtime loads the initial memory image and outputs the prompt; at which one can start typing **DEFVAR**<sup>[48]</sup>s, **DEFUN**<sup>[49]</sup>s and **DEFMACRO**<sup>[50]</sup>s.

To avoid having to re–enter the same definitions by hand in every session, one can create a lisp file with all the variables, functions, macros, etc.; (optionally) compile it with **COMPILE–FILE**<sup>[51]</sup>; and **LOAD**<sup>[31]</sup> it either by hand or from the RC file; or save a memory image to avoid the **LOAD**<sup>[31]</sup> overhead.

However, sometimes one needs to use some functionality implemented in another language, e.g., call a **C**<sup>[52]</sup> library function. For that one uses the Foreign Function Interface and/or the External Modules facility. Finally, the truly adventurous ones might delve into Extending the Core.

## FILES

**clisp**

**clisp.exe**

startup driver (an executable or, rarely, a shell script) which remembers the location of the runtime and starts it with the appropriate arguments

lisp.run

lisp.exe

main executable (runtime) – the part of **CLISP**<sup>[6]</sup> implemented in **C**<sup>[52]</sup>.

lispinit.mem

initial memory image (the part of **CLISP**<sup>[6]</sup> implemented in lisp)

config.lisp

site–dependent configuration (should have been customized before **CLISP**<sup>[6]</sup> was built); see Section 31.12, “Customizing CLISP behavior”

\*.lisp

lisp source

\*.fas

lisp code, compiled by **CLISP**<sup>[6]</sup>

\*.lib

lisp source library information, generated by **COMPILE–FILE**, see Section 24.3, “Function REQUIRE”.

\*.c

C code, compiled from lisp source by **CLISP**<sup>[6]</sup> (see Section 32.3, “The Foreign Function Call Facility”)

For the **CLISP**<sup>[6]</sup> source files, see Chapter 34, The source files of CLISP.

## ENVIRONMENT

All **environment variable**<sup>[12]</sup>s that **CLISP**<sup>[6]</sup> uses are read at most once.

### CLISP\_LANGUAGE

specifies the language **CLISP**<sup>[6]</sup> uses to communicate with the user. The legal values are identical to those of the **-L** option which can be used to override this **environment variable**<sup>[12]</sup>.

### LC\_CTYPE

specifies the locale which determines the character set in use. The value can be of the form *language* or *language\_country* or *language\_country.charset*, where *language* is a two-letter ISO 639 language code (lower case), *country* is a two-letter ISO 3166 country code (upper case). *charset* is an optional character set specification, and needs normally not be given because the character set can be inferred from the language and country. This **environment variable**<sup>[12]</sup> can be overridden with the **-Edomain encoding** option.

### LANG

specifies the language **CLISP**<sup>[6]</sup> uses to communicate with the user, unless it is already specified through the **environment variable**<sup>[12]</sup> **CLISP\_LANGUAGE** or the **-L** option. It also specifies the locale determining the character set in use, unless already specified through the **environment variable**<sup>[12]</sup> **LC\_CTYPE**. The value may begin with a two-letter ISO 639 language code, for example **en**, **de**, **fr**.

### HOME

### USER

used for determining the value of the function **USER-HOMEDIR-PATHNAME**<sup>[34]</sup>.

### SHELL

### COMSPEC

is used to find the interactive command interpreter called by **EXT:SHELL**.

### TERM

determines the screen size recognized by the pretty printer.

### ORGANIZATION

for **SHORT-SITE-NAME**<sup>[53]</sup> and **LONG-SITE-NAME**<sup>[53]</sup> in **config.lisp**.

### CLHSROOT

for **CUSTOM:CLHS-ROOT** in **config.lisp**.

### IMPNOTES

for **CUSTOM:IMPNOTES-ROOT** in **config.lisp**.

### EDITOR

for **editor-name** in **config.lisp**.

### LOGICAL\_HOST\_host\_FROM

### LOGICAL\_HOST\_host\_TO

### LOGICAL\_HOST\_host

for **CUSTOM:\*LOAD-LOGICAL-PATHNAME-TRANSLATIONS-DATABASE\***

## INPUT AND OUTUT

See Section 21.1.1, “Initialization of Standard Streams”.

## SEE ALSO

CLISP impnotes  
clisp-link(1)  
**CMU CL**<sup>[54]</sup> – **cmucl**(1)  
**SBCL**<sup>[55]</sup> – **sbcl**(1)  
**Emacs**<sup>[23]</sup> – **emacs**(1)

## BUGS

When you encounter a bug in **CLISP**<sup>[6]</sup> or in its documentation (this manual page or CLISP impnotes), please report it to the **CLISP**<sup>[6]</sup> **SourceForge bug tracker**<sup>[56]</sup>. Visit this bug tracker with a browser other

than Firefox (because as of May 2017, the "Create Ticket" button is not visible in Firefox). Then login, either to your [SourceForge](#)<sup>[57]</sup> account, or to your [OpenID](#)<sup>[58]</sup> account. Then press the "Create Ticket" button on the left-hand side.

*Before submitting a bug report, please take the following basic steps to make the report more useful:*

1. Unless your bug is locale-specific, please set your locale to en. You *cannot* assume that [CLISP](#)<sup>[6]</sup> maintainers understand a language other than [English](#)<sup>[59]</sup>, even though, historically, few [CLISP](#)<sup>[6]</sup> maintainers spoke English natively.
2. Do a clean build (remove your build directory and build [CLISP](#)<sup>[6]</sup> with `./configure --cbc build` or at least do a `make distclean` before `make`).
3. If you are reporting a "hard crash" (segmentation fault, bus error, core dump etc), please do `./configure --with-debug --cbc build-g ; cd build-g; gdb lisp.run`, then load the appropriate linking set by either `base` or `full` [gdb](#)<sup>[60]</sup> command, and report the backtrace (see also Q: A.1.1.10).
4. If you are using pre-built binaries and experience a hard crash, the problem is likely to be in the incompatibilities between the platform on which the binary was built and yours; please try compiling the sources and report the problem if it persists.

When submitting a bug report, please specify the following information:

1. What is your platform (`uname -a` on a [UNIX](#)<sup>[42]</sup> system)? Compiler version? [GNU](#)<sup>[8]</sup> [libc](#)<sup>[61]</sup> version (on [GNU](#)<sup>[8]</sup>/[Linux](#)<sup>[62]</sup>)?
2. Where did you get the sources or binaries? When? (Absolute dates, e.g., "2006-01-17", are preferred over the relative ones, e.g., "2 days ago". If you are using [Git](#)<sup>[63]</sup>, please supply the output of `git rev-list --max-count=1 HEAD`).
3. How did you build [CLISP](#)<sup>[6]</sup>? (What command, options &c.)
4. What is the output of `clisp --version`?
5. Please supply the full output (copy and paste) of all the error messages, as well as detailed instructions on how to reproduce them.

## PROJECTS

- Enhance the compiler so that it can inline local functions.
- Embed [CLISP](#)<sup>[6]</sup> in [VIM](#)<sup>[64]</sup>.

## AUTHORS

**Bruno Haible** <<http://www.haible.de/bruno/>>

The original author and long-time maintainer.

**Michael Stoll** <<http://www.mathe2.uni-bayreuth.de/stoll/>>

The original author.

**Sam Steingold** <<http://sds.podval.org/>>

Co-maintainer since 1998.

### Others

See *COPYRIGHT (file in the CLISP sources)* for the list of other contributors and the license.

## COPYRIGHT

Copyright © 1992-2010 Bruno Haible

Copyright © 1998-2010 Sam Steingold

## NOTES

1. **Common Lisp**  
<https://common-lisp.net>
2. read-eval-print loop  
[set \$man.base.url.for.relative.links]/sec\_25-1-1



3. **READ**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_readcm\\_re\\_g-whitespace.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_readcm_re_g-whitespace.html)
4. **EVAL**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_eval.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_eval.html)
5. **PRINT**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_writcm\\_p\\_rintcm\\_princ.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_writcm_p_rintcm_princ.html)
6. **CLISP**  
<http://clisp.org>
7. **LISP-IMPLEMENTATION-VERSION**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_lisp-impl\\_tion-version.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_lisp-impl_tion-version.html)
8. **GNU**  
<https://www.gnu.org>
9. **GPL**  
<https://www.gnu.org/copyleft/gpl.html>
10. **SYMBOL-MACRO**  
[set \$man.base.url.for.relative.links]/mac\_define-symbol-macro
11. **gzip**  
<http://www.gzip.org/>
12. environment variable  
[set \$man.base.url.for.relative.links]/basedefs/xbd\_chap08.html
13. **\*LOAD-VERBOSE\***  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var\\_stload-pr\\_ad-verbosest.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var_stload-pr_ad-verbosest.html)
14. **\*COMPILE-VERBOSE\***  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var\\_stcompile\\_le-verbosest.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var_stcompile_le-verbosest.html)
15. **T**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/convar\\_t.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/convar_t.html)
16. **NIL**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/convar\\_nil.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/convar_nil.html)
17. **continuable**  
[set \$man.base.url.for.relative.links]/clhs/glo
18. **ERROR**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/contyp\\_error.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/contyp_error.html)
19. **WARNING**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/contyp\\_warning.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/contyp_warning.html)
20. **INVOKE-DEBUGGER**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_invoke-debugger.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_invoke-debugger.html)
21. **ABORT**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_abortcm\\_c\\_cm\\_use-value.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_abortcm_c_cm_use-value.html)
22. **SIGNAL**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_signal.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_signal.html)
23. **Emacs**  
<https://www.gnu.org/software/emacs/>
24. **SLIME**  
<https://common-lisp.net/project/slime/>
25. **ILISP**  
<https://sourceforge.net/projects/ilisp/>

- 26. `readline`  
<http://tiswww.case.edu/php/chet/readline/readline.html>
- 27. *ASCII*  
<https://en.wikipedia.org/wiki/ASCII>
- 28. *\*PACKAGE\**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var\\_stpackagest.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var_stpackagest.html)
- 29. *\*PRINT-CASE\**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var\\_stprint-casest.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var_stprint-casest.html)
- 30. “COMMON-LISP-USER”  
[set \$man.base.url.for.relative.links]/sec\_11-1-2-2
- 31. **LOAD**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_load.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_load.html)
- 32. **COMPILE**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_compile.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_compile.html)
- 33. “run  
control” (RC)  
<http://www.faqs.org/docs/artu/ch10s03.html>
- 34. **USER-HOMEDIR-PATHNAME**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_user-homedir-pathname.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_user-homedir-pathname.html)
- 35. **DISASSEMBLE**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_disassemble.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_disassemble.html)
- 36. *\*STANDARD-OUTPUT\**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var\\_stdebug-i\\_ace-outputst.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/var_stdebug-i_ace-outputst.html)
- 37. **LIST**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/syscla\\_list.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/syscla_list.html)
- 38. **ANSI**  
<https://www.ansi.org/>
- 39. The American National Standards Institute
- 40. **ANSI**  
<https://webstore.ansi.org>
- 41. **SYMBOL**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/syscla\\_symbol.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/syscla_symbol.html)
- 42. **UNIX**  
<http://www.unix.org/online.html>
- 43. *Win32*  
<https://winehq.org/>
- 44. **#’**  
[set \$man.base.url.for.relative.links]/sec\_2-4-8-2
- 45. **#P**  
[set \$man.base.url.for.relative.links]/sec\_2-4-8-14
- 46. **bash**  
<https://www.gnu.org/software/bash/>
- 47. John Foderaro  
<http://www.franz.com/~jkf/>
- 48. **DEFVAR**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/mac\\_defparametercm\\_defvar.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/mac_defparametercm_defvar.html)

- 49. **DEFUN**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/mac\\_defun.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/mac_defun.html)
- 50. **DEFMACRO**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/mac\\_defmacro.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/mac_defmacro.html)
- 51. **COMPILE-FILE**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_compile-file.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_compile-file.html)
- 52. **C**  
<http://c-faq.com/>
- 53. **SHORT-SITE-NAME**  
[http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun\\_short-sit\\_ng-site-name.html](http://www.ai.mit.edu/projects/iiip/doc/CommonLISP/HyperSpec/Body/fun_short-sit_ng-site-name.html)
- 54. **CMU CL**  
<https://www.cons.org/cmuc1/>
- 55. **SBCL**  
<http://www.sbcl.org/>
- 56. SourceForge bug tracker  
<https://sourceforge.net/p/clisp/bugs/>
- 57. SourceForge  
<https://sourceforge.net>
- 58. OpenID  
<https://openid.net/>
- 59. English  
<http://www.catb.org/esr/faqs/hacker-howto.html#skills4>
- 60. **gdb**  
<https://www.sourceware.org/gdb/>
- 61. **libc**  
<https://www.gnu.org/software/libc/>
- 62. *Linux*  
<https://www.kernel.org/>
- 63. Mercurial  
<https://www.mercurial-scm.org/>
- 64. **VIM**  
<https://www.vim.org>