

# Clojure Cheat Sheet (Clojure 1.3 - 1.6, sheet v22)

## Documentation

clojure.repl/ doc find-doc apropos source pst javadoc (foo.bar/ is namespace for later syms)

## Primitives

### Numbers

Literals Long: 7, hex 0xff, oct 017, base 2 2r1011, base 36 36rCRAZY BigInt: 7N Ratio: -22/7 Double: 2.78 -1.2e-5 BigDecimal: 4.2M

Arithmetic + - \* / quot rem mod inc dec max min +' -' \*' inc' dec'

Compare == < > <= >= compare

Bitwise bit-and bit-or bit-xor bit-not bit-flip bit-set bit-shift-right bit-shift-left bit-and-not bit-clear bit-test (1.6) unsigned-bit-shift-right (see BigInteger for integers larger than Long)

Cast byte short int long float double bigdec bigint num rationalize biginteger

Test zero? pos? neg? even? odd? number? rational? integer? ratio? decimal? float?

Random rand rand-int

BigDecimal with-precision

Unchecked \*unchecked-math\* unchecked-add unchecked-dec unchecked-inc unchecked-multiply unchecked-negate unchecked-subtract

### Strings

Create str format "a string" "escapes \b\f\n\t\r\" octal \377 hex \ucafe" See also IO/to string

Use count get subs compare (clojure.string/) join escape split split-lines replace replace-first reverse (1.5) re-quote-replacement (String) .indexOf .lastIndexOf

Regex #"pattern" re-find re-seq re-matches re-pattern re-matcher re-groups (clojure.string/) replace replace-first (1.5) re-quote-replacement

Letters (clojure.string/) capitalize lower-case upper-case

Trim (clojure.string/) trim trim-newline triml trimr

Test char char? string? (clojure.string/) blank? (String) .startsWith .endsWith .contains

### Other

Characters char char-name-string char-escape-string literals: \a \newline (more at link)

Keywords keyword keyword? find-keyword literals: :kw :my.ns/kw ::in-cur-ns

Symbols symbol symbol? gensym literals: my-sym my.ns/foo

Misc literals: true false nil

## Collections

### Collections

Generic ops count empty not-empty into conj (clojure.walk/) walk prewalk prewalk-demo prewalk-replace postwalk postwalk-demo postwalk-replace

Content tests distinct? empty? every? not-every? some not-any?

Capabilities sequential? associative? sorted? counted? reversible?

Type tests coll? list? vector? set? map? seq? (1.6) record?

### Lists

Create '() list list\*

Examine first nth peek .indexOf .lastIndexOf

'Change' cons conj rest pop

### Vectors

Create [] vector vec vector-of (1.4) mapv filterv

Examine (my-vec idx) → ( nth my-vec idx) get peek .indexOf .lastIndexOf

'Change' assoc pop subvec replace conj rseq

Ops (1.4) reduce-kv

### Sets

Create #{ } set hash-set sorted-set sorted-set-by (flat-land.ordered.set/) ordered-set

Examine (my-set item) → ( get my-set item) contains?

'Change' conj disj

Set ops (clojure.set/) union difference intersection select See also Relations

Test (clojure.set/) subset? superset?

Sorted sets rseq subseq rsubseq

### Maps

Create {} hash-map array-map zipmap sorted-map sorted-map-by bean frequencies group-by (clojure.set/) index (flat-land.ordered.map/) ordered-map (clojure.data.priority-map/) priority-map (flatland.useful.map/) ordering-map

Examine (my-map k) → ( get my-map k) also (:key my-map) → ( get my-map :key) get-in contains? find keys vals

'Change' assoc assoc-in dissoc merge merge-with select-keys update-in (clojure.set/) rename-keys map-invert GitHub: Medley

Ops (1.4) reduce-kv

Entry key val

Sorted maps rseq subseq rsubseq

## Relations (set of maps, each with same keys, aka rels)

Rel algebra (clojure.set/) join select project union difference intersection index rename

## Transients (clojure.org/transients)

Create transient persistent!

Change conj! pop! assoc! dissoc! disj! Note: always use return value for later changes, never original!

## Misc

Compare = identical? not= not compare clojure.data/diff

Test true? false? instance? nil? (1.6) some?

## Sequences

### Creating a Lazy Seq

From collection seq vals keys rseq subseq rsubseq

From producer fn lazy-seq repeatedly iterate

From constant repeat range

From other file-seq line-seq resultset-seq re-seq tree-seq xml-seq iterator-seq enumeration-seq

keep keep-indexed

### Seq in, Seq out

Get shorter distinct filter remove take-nth for

Get longer cons conj concat lazy-cat mapcat cycle interleave interpose

Tail-items rest nthrest next fnext nnext drop drop-while take-last for

Head-items take take-while butlast drop-last for

'Change' conj concat distinct flatten group-by partition partition-all partition-by split-at split-with filter remove replace shuffle

Rearrange reverse sort sort-by compare

Process items map pmap map-indexed mapcat for replace seque

### Using a Seq

Extract item first second last rest next ffirst nfirst fnext nnext nth nthnext rand-nth when-first max-key min-key

Construct coll zipmap into reduce reductions set vec into-array to-array-2d (1.4) mapv filterv

Pass to fn apply

Search some filter

Force evaluation doseq dorun doall

Check for forced realized?

## Zippers (clojure.zip/)

Create zipper seq-zip vector-zip xml-zip

Get loc up down left right leftmost rightmost

Get seq lefts rights path children

'Change' make-node replace edit insert-child insert-left insert-right append-child remove

Move next prev

Misc root node branch? end?

## IO

to/from spit slurp (to writer/from reader, Socket, string with file name, URI, etc.)

... to \*out\* pr prn print printf println newline (clojure.pprint/) print-table

to writer (clojure.pprint/) pprint cl-format also: (binding [\*out\* writer] ...)

to string format with-out-str pr-str prn-str print-str println-str

from \*in\* read-line (clojure.tools.reader.edn/) read

from reader line-seq (clojure.tools.reader.edn/) read also: (binding [\*in\* reader] ...) java.io.Reader

from string with-in-str (clojure.tools.reader.edn/) read-string

Open with-open (clojure.java.io/) text: reader writer binary: input-stream output-stream

Binary (.write ostream byte-arr) (.read istream byte-arr) java.io.OutputStream java.io.InputStream GitHub: gloss

Misc byte-spec flush (.close s) file-seq \*in\* \*out\* \*err\* (clojure.java.io/) file copy delete-file resource as-file as-url as-relative-path GitHub: fs

Data readers (1.4) \*data-readers\* default-data-readers (1.5) \*default-data-reader-fn\*

## Functions

Create fn defn defn- definline identity constantly memfn comp

Call complement partial juxt memoize fnil every-pred some-fn apply -> ->> trampoline (1.5) as-> cond-> cond->> some->>

Test fn? ifn?

## Abstractions (Clojure type selection flowchart)

### Protocols ([clojure.org/protocols](http://clojure.org/protocols))

Define	( defprotocol Slicey (slice [at]))
Extend	( extend-type String Slicey (slice [at] ...))
Extend null	( extend-type nil Slicey (slice [_] nil))
Reify	( reify Slicey (slice [at] ...))
Test	satisfies? extends?
Other	extend extend-protocol extenders

### Records ([clojure.org/datatypes](http://clojure.org/datatypes))

Define	( defrecord Pair [h t])
Access	(:h (Pair. 1 2)) → 1
Create	Pair. ->Pair map->Pair
Test	record?

### Types ([clojure.org/datatypes](http://clojure.org/datatypes))

Define	( deftype Pair [h t])
Access	(.h (Pair. 1 2)) → 1
Create	Pair. ->Pair
	( deftype Pair [h t]
With methods	Object
	(toString [this] (str "<" h " " t ">")))

### Multimethods ([clojure.org/multimethods](http://clojure.org/multimethods))

Define	( defmulti my-mm dispatch-fn)
Method define	( defmethod my-mm :dispatch-value [args] ...)
Dispatch	get-method methods
Remove	remove-method remove-all-methods
Prefer	prefer-method prefers
Relation	derive isa? parents ancestors descendants
	make-hierarchy

## Macros

Create	defmacro definline
Debug	macroexpand-1 macroexpand (clojure.walk/) macroexpand-all
Branch	and or when when-not when-let when-first if-not if-let
	cond condp case (1.6) when-some if-some
Loop	for doseq dotimes while
Arrange	.. doto -> ->> (1.5) as-> cond-> cond->> some-> some->>
Scope	binding locking time with-in-str with-local-vars
	with-open with-out-str with-precision with-redefs
	with-redefs-fn
Lazy	lazy-cat lazy-seq delay
Doc.	assert comment doc

### Reader Macros ([clojure.org/reader](http://clojure.org/reader))

'	quote: 'form → ( quote form)
\	Character literal
;	Single line comment
~	Metadata (see Metadata section)
@	Deref: @form → ( deref form)
'	Syntax-quote
~	Unquote
~@	Unquote-splicing
#"p"	Regex Pattern <i>p</i> (see Strings/Regex section)
#'	Var-quote #'x → ( var x)
#()	Anonymous function literal: #(...) → (fn [args] (...))
#_	Ignore next form

### Metadata ([clojure.org/reader](http://clojure.org/reader), [special\\_forms](http://clojure.org/special_forms))

General	^{:key1 val1 :key2 val2 ...}
Abbrevs	^Type → ^{:tag Type}, ^:key → ^{:key true}
Common	^:dynamic ^:private ^:doc ^:const
Examples	(defn ^:private ^String my-fn ...) (def ^:dynamic *dyn-var* val)
On Vars	meta with-meta vary-meta alter-meta! reset-meta! doc find-doc test

### Special Forms ([clojure.org/special\\_forms](http://clojure.org/special_forms))

def	if do let letfn quote var fn loop recur set! throw try
monitor-enter	monitor-exit
Binding Forms /	(examples) let fn defn defmacro loop for doseq
Destructuring	if-let when-let (1.6) if-some when-some

### Vars and global environment ([clojure.org/vars](http://clojure.org/vars))

Def variants	def defn defn- definline defmacro defmethod defmulti defonce defrecord
Interned vars	declare intern binding find-var var
Var objects	with-local-vars var-get var-set alter-var-root var?
	bound? thread-bound?
Var validators	set-validator! get-validator

## Namespace

Current	*ns*
Create/Switch	(tutorial) ns in-ns create-ns
Add	alias def import intern refer
Find	all-ns find-ns
Examine	ns-name ns-aliases ns-map ns-interns ns-publics
	ns-refers ns-imports
From symbol	resolve ns-resolve namespace the-ns
Remove	ns-unalias ns-unmap remove-ns

## Loading

Load libs	(tutorial) require use import refer
List loaded	loaded-libs
Load misc	load load-file load-reader load-string

## Concurrency

Atoms	atom swap! reset! compare-and-set!
Futures	future future-call future-done? future-cancel
	future-cancelled? future?
Threads	bound-fn bound-fn* get-thread-bindings
	push-thread-bindings pop-thread-bindings thread-bound?
Misc	locking pcalls pvalues pmap seque promise deliver

### Refs and Transactions ([clojure.org/refs](http://clojure.org/refs))

Create	ref
Examine	deref @ (@form → (deref form))
Transaction	sync dosync io!
In transaction	ensure ref-set alter commute
Validators	set-validator! get-validator
History	ref-history-count ref-min-history ref-max-history

### Agents and Asynchronous Actions ([clojure.org/agents](http://clojure.org/agents))

Create	agent
Examine	agent-error
Change state	send send-off restart-agent (1.5)
	send-via set-agent-send-executor!
	set-agent-send-off-executor!
Block waiting	await await-for
Ref validators	set-validator! get-validator
Watchers	add-watch remove-watch
Thread handling	shutdown-agents
Error	error-handler set-error-handler! error-mode
	set-error-mode!
Misc	*agent* release-pending-sends

### Java Interoperation ([clojure.org/java\\_interop](http://clojure.org/java_interop))

General	.. doto Classname/ Classname. new bean comparator
	enumeration-seq import iterator-seq memfn set! class
	class? bases supers type
Cast	boolean byte short char int long float double bigdec
	bigint num cast biginteger
Exceptions	throw try catch finally pst (1.4) ex-info ex-data

### Arrays

Create	make-array object-array boolean-array byte-array
	short-array char-array int-array long-array float-array
	double-array aclone to-array to-array-2d into-array
Use	aget aset aset-boolean aset-byte aset-short aset-char
	aset-int aset-long aset-float aset-double alength amap
	areduce
Cast	booleans bytes shorts chars ints longs floats doubles

### Proxy (Clojure type selection flowchart)

Create	proxy get-proxy-class construct-proxy init-proxy
Misc	proxy-mappings proxy-super update-proxy

## Other

XML	clojure.xml/parse xml-seq
REPL	*1 *2 *3 *e *print-dup* *print-length* *print-level*
	*print-meta* *print-readably*
Code	*compile-files* *compile-path* *file*
	*warn-on-reflection* compile gen-class gen-interface
	loaded-libs test
Misc	eval force hash name *clojure-version* clojure-version
	*command-line-args*
Browser	(clojure.java.browse/) browse-url (clojure.java.shell/) sh
/ Shell	with-sh-dir with-sh-env