

# Clojure Cheat Sheet (Clojure 1.3 - 1.6, sheet v21)

## 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 = == not= < > <= >= 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 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  
Keywords keyword keyword? find-keyword  
Symbols symbol symbol? gensym

## 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 (clojure.set/) union difference intersection select See also Relations  
Set ops (clojure.set/) subset? superset?  
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 (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  
From 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?

## Zipers (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, URL, 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 byte-spec  
Misc 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 complement partial juxt memoize fnil every-pred some-fn  
Call apply -> ->> trampoline (1.5) as-> cond-> cond->> some-> some->>  
Test fn? ifn?

## Abstractions (Clojure type selection flowchart)

### Protocols (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)

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

### Types (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)

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)

'	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, 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)

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)

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)

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)

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)

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
	clone 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