

# Clojure Cheat Sheet (Clojure 1.3 - 1.5, sheet v9)

## 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  
Compare = == not= < > <= >= compare  
Bitwise bit-{and, or, xor, not, flip, set, shift-right, shift-left, and-not, clear, test}  
Cast byte short int long float double bigdec bigint num rationalize biginteger  
Test nil? identical? zero? pos? neg? even? odd?  
Random rand rand-int  
BigDecimal with-precision  
Unchecked \*unchecked-math\* unchecked-{add, dec, divide, inc, multiply, negate, remainder, subtract}-int

### 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?

### 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?

### Lists

Create '() list list\*  
Examine first nth peek .indexOf .lastIndexOf  
'Change' cons conj rest pop

### Vectors

Create [] vector vec vector-of  
Examine (my-vec idx) → ( nth my-vec idx) get peek .indexOf .lastIndexOf  
'Change' assoc pop subvec replace conj rseq  
Ops (1.4) mapv filterv reduce-kv

### Sets

Create #{ } set hash-set sorted-set sorted-set-by  
Examine (my-set item) → ( get my-set item) contains?  
'Change' conj disj  
Rel algebra (clojure.set/) join select project union difference intersection  
Get map (clojure.set/) index rename-keys rename map-invert  
Test (clojure.set/) subset? superset?

### Maps

Create {} hash-map array-map zipmap sorted-map sorted-map-by bean frequencies group-by  
Examine (: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  
Entry key val  
Sorted maps rseq subseq rsubseq

## 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? nil? instance?

## 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 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 reverse sort sort-by compare  
Rearrange 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  
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 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 -> ->> (1.5) as-> cond-> cond->> some->> some->>  
Test fn? ifn?

## Abstractions

### 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] ...))
```

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

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

### 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]
              Object
              (toString [this] (str "< h ", " t ">")))

With methods
```

### 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
Loop         for doseq dotimes while
Arrange      .. doto -> ->> (1.5) as-> cond-> cond->> some->
            some->>
Scope        binding locking time with-{in-str, local-vars,
            open, out-str, precision, redefs, redefs-fn}
Lazy         lazy-cat lazy-seq delay
Doc.         assert comment doc
```

## Reader Macros

```
'          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 p
#'         Var quote #'x → (var x)
#()        #(…) → (fn [args] (...))
#_         Ignore next form
```

## Metadata ([clojure.org/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 quote var fn loop recur throw try
monitor-enter monitor-exit
Binding Forms / (examples) let fn defn defmacro loop for
Destructuring   doseq if-let when-let
```

## 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?
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, aliases, map, interns, publics,
            refers, imports}
From symbol   resolve ns-resolve namespace
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, done?, cancel, cancelled?}
              future?
Threads        bound-fn bound-fn* {get, push, 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, 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!
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, boolean, byte, short, char,
            int, long, float, double}-array aclone to-array
            to-array-2d into-array
Use            aget aset aset-{boolean, byte, short, char, int,
            long, float, double} alength amap areduce
Cast           booleans bytes shorts chars ints longs floats
            doubles
```

## Proxy

```
Create         proxy get-proxy-class {construct, 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
```