

Clojure Cheat Sheet (Clojure 1.6 - 1.9, sheet v45)

| | |
|---|---|
| Documentation | |
| clojure.repl/ | doc find-doc apropos dir 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 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? (1.9) double? int? nat-int? neg-int? pos-int? |
| 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 section IO/to string |
| Use | count get subs compare (clojure.string/) join escape split split-lines replace replace-first reverse (1.8) index-of last-index-of |
| Regex | #"pattern" re-find re-seq re-matches re-pattern re-matcher re-groups (clojure.string/) replace replace-first re-quote-replacement Note: \ in #"\" is not escape char. (re-pattern "\\\s*\\d+") can be written #"\\s*\\d+" |
| Letters | (clojure.string/) capitalize lower-case upper-case |
| Trim | (clojure.string/) trim trim-newline triml trimr |
| Test | string? (clojure.string/) blank? (1.8) starts-with? ends-with? includes? |
| Other | |
| Characters | char char? char-name-string char-escape-string literals: \a \newline (more at link) |
| Keywords | keyword keyword? find-keyword literals: :kw :my.name.space/kw ::in-cur-namespace ::namespace-alias/kw |
| 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 (1.9) bounded-count |
| Content tests | distinct? empty? every? not-every? some not-any? |
| Capabilities | sequential? associative? sorted? counted? reversible? |
| Type tests | coll? list? vector? set? map? seq? record? (1.8) map-entry? |
| Lists (conj, pop, & peek at beginning) | |
| Create | () list list* |
| Examine | first nth peek .indexOf .lastIndexOf |
| 'Change' | cons conj rest pop |
| Vectors (conj, pop, & peek at end) | |
| Create | [] vector vec vector-of mapv filterv (clojure.core.rrb-vector/) vector vec vector-of |
| Examine | (my-vec idx) → (nth my-vec idx) get peek .indexOf .lastIndexOf |
| 'Change' | assoc assoc-in pop subvec replace conj rseq update-in (1.7) update |
| Ops | reduce-kv |
| Sets | |
| Create unsorted | #{} set hash-set |
| Create sorted | sorted-set sorted-set-by (clojure.data.avl/) sorted-set sorted-set-by (flatland.ordered.set/) ordered-set (clojure.data.int-map/) int-set dense-int-set (my-set item) → (get my-set item) contains? |
| Examine | conj disj |
| 'Change' | (clojure.set/) union difference intersection select See also section Relations |
| Set ops | (clojure.set/) subset? superset? |
| Test | rseq subseq rsubseq |
| Sorted sets | |
| Maps | |
| Create unsorted | { } hash-map array-map zipmap bean frequencies group-by (clojure.set/) index |
| Create sorted | sorted-map sorted-map-by (clojure.data.avl/) sorted-map sorted-map-by (flatland.ordered.map/) ordered-map (clojure.data.priority-map/) priority-map (flatland.useful.map/) ordering-map (clojure.data.int-map/) int-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 (1.7) update (clojure.set/) rename-keys map-invert GitHub: Medley |
| Ops | reduce-kv |
| Entry | key val |
| Sorted maps | rseq subseq rsubseq |
| Queues (conj at end, peek & pop from beginning) | |
| Create | clojure.lang.PersistentQueue/EMPTY (no literal syntax or constructor fn) |
| Examine | peek |
| 'Change' | conj pop |

| | |
|--|---|
| 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/reference/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? some? |
| Sequences | |
| Creating a Lazy Seq | |
| From collection | seq vals keys rseq subseq rsubseq sequence |
| 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 (1.7) dedupe random-sample |
| 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 reverse sort sort-by compare |
| Rearrange | map pmap map-indexed mapcat for replace seque |
| Process items | |
| 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 mapv filterv |
| Pass to fn | apply |
| Search | some filter |
| Force evaluation | doseq dorun doall (1.7) run! |
| Check for forced | realized? |
| Transducers (clojure.org/reference/transducers) | |
| Off the shelf | map mapcat filter remove take take-while take-nth drop drop-while replace partition-by partition-all keep keep-indexed map-indexed distinct interpose (1.7) cat dedupe random-sample (1.9) halt-when |
| Create your own | (1.7) completing ensure-reduced unreduced See also section Concurrency/Volatiles |
| Use | into sequence (1.7) transduce eduction |
| Early termination | reduced reduced? deref |
| Spec (rationale, guide) | |
| Operations | valid? conform uniform explain explain-data explain-str explain-out form describe assert check-asserts check-asserts? |
| Generator ops | gen exercise exercise-fn |
| Defn. & registry | def idef registry get-spec spec? spec with-gen |
| Logical | and or |
| Collection | coll-of map-of every every-kv keys merge |
| Regex | cat alt * + ? & keys* |
| Range | int-in inst-in double-in int-in-range? inst-in-range? |
| Other | nilable multi-spec fspec conformer |
| Custom explain | explain-printer *explain-out* |
| Predicates with test.check generators | |
| Numbers | number? rational? integer? ratio? decimal? float? zero? (1.9) double? int? nat-int? neg-int? pos-int? |
| Symbols, | keyword? symbol? (1.9) ident? qualified-ident? |
| keywords | qualified-keyword? qualified-symbol? simple-ident? simple-keyword? simple-symbol? |
| Other | string? true? false? nil? some? (1.9) boolean? bytes? inst? |
| scalars | uri? uuid? |
| Collections | list? map? set? vector? associative? coll? sequential? seq? empty? (1.9) indexed? seqable? |
| Other | (1.9) any? |
| 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 (clojure.pprint/) pprint cl-format also: (binding [*out* writer] ...) |
| to writer | format with-out-str pr-str prn-str print-str println-str |
| to string | read-line (clojure.tools.reader.edn/) read |
| from *in* | line-seq (clojure.tools.reader.edn/) read also: (binding [*in* reader] ...) java.io.Reader |
| from reader | 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 | *data-readers* default-data-readers *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 as-> cond-> cond->> some-> some->> |
| Test | fn? ifn? |

Abstractions (Clojure type selection flowchart)

Protocols (clojure.org/reference/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/reference/datatypes)

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

Types (clojure.org/reference/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/reference/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 underive 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 |
| | when-some if-some |
| Loop | for doseq dotimes while |
| Arrange | .. doto -> ->> 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 |

Special Characters (clojure.org/reference/reader, guide)

| | |
|---------------|---|
| , | Comma reads as white space. Often used between map key/value pairs for readability. |
| ' | quote: 'form → (quote form) |
| / | Namespace separator (see Primitives/Other section) |
| \ | Character literal (see Primitives/Other section) |
| : | Keyword (see Primitives/Other section) |
| ; | Single line comment |
| ~ | Metadata (see Metadata section) |
| *foo* | 'earmuffs' - convention to indicate dynamic vars, compiler warns if not dynamic |
| @ | Deref: @form → (deref form) |
| ' | Syntax-quote |
| foo# | 'auto-gensym', consistently replaced with same auto-generated symbol everywhere inside same '(...) |
| ~ | Unquote |
| ~-@ | Unquote-splicing |
| -> | 'thread first' macro -> |
| ->> | 'thread last' macro ->> |
| >!! <!! >! <! | core.async channel macros >!! <!! >! <! |
| (| List literal (see Collections/Lists section) |
| [| Vector literal (see Collections/Vectors section) |
| { | Map literal (see Collections/Maps section) |
| #' | Var-quote #'x → (var x) |
| #" | #"p" reads as regex pattern p (see Strings/Regex section) |
| #{ | Set literal (see Collections/Sets section) |
| #(| Anonymous function literal: #(...) → (fn [args] (...)) |
| % | Anonymous function argument: %N is value of anonymous function arg N. % short for %1. %& for rest args. |
| ##? | (1.7) Reader conditional: ##?(:clj x :cljs y) reads as x on JVM, y in ClojureScript, nothing elsewhere. Other keys: :cljr :default |
| ##?@ | (1.7) Splicing reader conditional: [1 ##?@(:clj [x y] :cljs [w z]) 3] reads as [1 x y 3] on JVM, [1 w z 3] in ClojureScript, [1 3] elsewhere. |
| #foo | tagged literal e.g. #inst #uuid |
| #: | map namespace syntax e.g. #:foo{:a 1 :b 2} is equal to {:foo/a 1 :foo/b 2} |
| ## | (1.9) symbolic values: ##Inf ##-Inf ##NaN |
| \$ | JavaContainerClass\$InnerClass |
| foo? | conventional ending for a predicate, e.g.: zero? vector? |
| foo! | instance? (unenforced) |
| | conventional ending for an unsafe operation, e.g.: set! |
| | swap! alter-meta! (unenforced) |
| - | conventional name for an unused value (unenforced) |
| _ | Ignore next form |

Metadata (clojure.org/reference/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/reference/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 if-let when-let |
| Destructuring | if-some when-some |

Vars and global environment (clojure.org/reference/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! (1.9) swap-vals! reset-vals! |
| 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? |
| Volatiles | (1.7) volatile! vreset! vswap! volatile? |
| Misc | locking pcalls pvalues pmap seque promise deliver |

Refs and Transactions (clojure.org/reference/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/reference/agents)

| | |
|-----------------|--|
| Create | agent |
| Examine | agent-error |
| Change state | send send-off restart-agent 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/reference/java_interop)

| | |
|------------|--|
| General | .. doto Classname/ Classname. new bean comparator enumeration-seq import iterator-seq memfn set! class class? bases supers type gen-class gen-interface definterface |
| Cast | boolean byte short char int long float double bigdec bigint num cast biginteger |
| Exceptions | throw try catch finally pst ex-info ex-data (1.9) StackTraceElement->vec |

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 |

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? |

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 loaded-libs test |
| Misc | eval force hash name *clojure-version* clojure-version *command-line-args* (clojure.java.browse/) browse-url (clojure.java.shell/) sh with-sh-dir with-sh-env |