Clojure Functional Lisp on the JVM

Source form (+ 1 2) → *read* → **Data structure** list of symbols → *compile* → **JVM bytecode** on the fly → *run* → **Value** 3

CONCEPTS

> Code is data: everything is (function arg ...). Collections are immutable, so assoc and conj return new values.

COMMAND LINE

`clj`
Start a REPL with line editing (rlwrap)

`clojure`
Run without rlwrap, for scripts and pipes

`clojure -M -m <ns>`
Run the -main function of a namespace

`clojure -M <file.clj>`
Run a script file

`clojure -M:<alias>`
Run with a deps.edn alias

`clojure -X <ns>/<fn> :k v`
Call a function with a map of args

REPL

`(doc <name>)`
Show docs for a name

`(source <name>)`
Print the source of a function

REPL (cont.)

`*1 / *2 / *e`
Last results / last exception

`(require '[<ns> :as <a>] :reload)`
Load a namespace, re-reading its file

BASICS

`(def x 1)`
Define a var in the namespace

`(defn f "doc" [a & more] ...)`
Function with docstring and rest args

`(fn [x] ...) / #(* % 2)`
Anonymous function, short form

`(let [a 1 b (+ a 1)] ...)`
Local bindings, sequential

`(if <t> <a> <b>) / (when <t> ...)`
Conditional / one-armed with body

`(cond <t1> <a> :else <b>)`
Multi-way conditional

`(loop [i 0] (recur (inc i)))`
Loop with explicit recur

BASICS (cont.)

`(doseq [x xs] ...)`
Loop for side effects

`(for [x xs :when (odd? x)] ...)`
Lazy list comprehension

`(str "a" 1 :b)`
Concatenate as strings

`(println ...) / (prn ...)`
Print for humans / as readable data

`(try ... (catch Exception e ...) (finally ...))`
Handle errors

`(nil? x) / (some? x)`
Nil tests

`(= a b) / (not= a b)`
Value equality

COLLECTIONS

`[1 2 3] / '(1 2 3)`
Vector / list literal

`{:a 1 :b 2}`
Map literal

`#{1 2 3}`
Set literal

`(conj coll x)`
Add: end of vector, front of list

COLLECTIONS (cont.)

`(assoc m :k v)`
Add or replace a key (or vector index)

`(dissoc m :k)`
Remove a key

`(get m :k <default>) / (:k m)`
Look up a key

`(get-in m [:a :b])`
Look up a nested path

`(assoc-in m [:a :b] v)`
Set a nested path

`(update m :k inc)`
Apply a function to a value

`(update-in m [:a :b] f)`
Apply a function at a nested path

`(merge m1 m2)`
Combine maps, later wins

`(keys m) / (vals m)`
Keys / values of a map

`(count c) / (empty? c)`
Size / emptiness

SEQUENCES

`(map f xs)`
Apply f to each item, lazily

`(filter pred xs) / (remove pred xs)`
Keep / drop matching items

SEQUENCES (cont.)

`(reduce f init xs)`
Fold into one value

FUNCTIONS & MACROS

`(→ x (f a) (g b))`
Thread x as first argument

`(→» xs (map f) (filter p))`
Thread as last argument

`(fn [{:keys [a b]}] ...)`
Destructure a map argument

`(let [[a b & r] xs] ...)`
Destructure a sequence

STATE & CONCURRENCY

`(swap! a f args)`
Atomically update with f

NAMESPACES & JAVA

`(ns <name> (:require [<lib> :as <a>]))`
Declare a namespace and its deps

`(require '[clojure.string :as str])`
Load a library with an alias