

Toccata: *A New Language*

Toccata: A New Language

Clojure's good parts:

Lisp, with a little syntax

Immutable by default

Protocols

Toccata: A New Language

That:

is easy to get started with

compiles to C

includes Category Theory

Toccata: A New Language

Core protocol:

```
(defprotocol Container
  (flat-map [x f])
  (extract [x])
  (extend [x f])
  (wrap [x v])
  (apply* [xf args])
  (map [x f])
  (send* [x f-and-args]))
```

Toccata: A New Language

These are all forms of function composition

Data structures compose data

Function composition composes solutions

Toccata: A New Language

Imperative

flat-map, wrap

Concatenative (Forth, Joy)

plain fn composition

Logic (miniKanren, Prolog)

flat-map

Query (SQL, GraphQL)

flat-map

Reactive

send, extract

OOP

extract, extend

Toccata: A New Language

Tools

Language - conceptualize and encode ideas

Package System - share code with others

Modeler - extract meaning

Formatter - make it pretty

Checker - verify correctness to extent possible

Compiler - make it runnable

Tester - find inputs that trigger bugs

Debugger - fix bugs