

QL in Clojure

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Why Clojure

- Made for DSLs
- Give me a general purpose programming language with DSL support over dedicated tools!
- Selfish: learning a Lisp

QL

```
(defform box1-house-owning
  [boolean has-sold-house "Did you sell a house in 2010?"]
  [boolean has-bought-house "Did you buy a house in 2010?"]
  [boolean has-maint-loan "Did you enter a loan for maintenance/
reconstruction?"]
  [group has-sold-house
    [currency selling-price "Price the house was sold for"]
    [currency private-debt "Private debts for the sold house"]
    [calc value-residue (- selling-price private-debt) "Value
residue"]
    [calc twice (* 2 value-residue) "Twice that"]
  ])
```

Design

- defform is a macro that transforms the expression into a program that accepts a 'renderer' to do the output work
- Renderer interface:
 - (init)
 - (new-widget [type value caption])
 - (new-group [widgets])
 - (display [root-widget])

Design

- Pattern matching to construct tree based on input
- widget interface:
 - (widget-value)
 - (widget-listen [listener])

Design

- form-element interface:
 - (el-value [name root])
 - (el-listen [listener])
 - (el-refresh! [root])

Get value from form

- Values live in widgets
 - Expressions get values from widgets at evaluation time
 - Limitation: *can't properly have two widgets with the same name*)
- Form is also a group
- Ask root group for value of *name*
 - (= name my-name) return my value
 - (isgroup? and visible?) ask value of children
 - otherwise *undefined*

Updates

- When a widget is changed all form elements are updated

Expression language

- Expressions are transformed into functions that accept a function that accepts a variable name
- Special value *undefined*
- Lifted arithmetic: $* \rightarrow *$ which returns *undefined* if any of its arguments is undefined

Static Analysis

- Unknown variables
- TODO: dependencies

Evaluation

- The Good
 - Definining DSLs is trivial!
- The Bad
 - Dynamic typing :(--> Scala, editor support for free
- The Ugly
 - Diagnosing Clojure error messages