## JAVASCRIPT'S

# FUNCTIONAL WAY

## INDEX.JS

- Why FP?
- Lambda vs State (Holly Paradigm wars)
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## WHY FP?

- Minimize side effects of
- Minimize amount of code
- Simplify testing

#### FP STATEMENTS

- Category Theory
- Lambda calculous
- Functional approach
- Expressions and constants

Determinism/abstraction

#### **IMPERATIVE STATEMENTS**

- Automata theory
- State machine
- Procedural approach
- Variables

Butterfly effect/changing

## **BENEFITS**

- No side effects
- Highly abstract
- Less of code

## RESTRICTIONS

- Entry-barrier is high
- Hard to store/cache/memoize
- Hard to IO

## ABSTRACTION, COMPOSITION, IDENTITY

- Abstraction: what can be more abstract than y=f(x)...?
- Composition:
  if a=>b and b=>c, so there is identical way a=>c, so that
  b = f(a), c = g(b), there is c=h(a), which composes:
  h = (a) => g(f(a))
- Identity: a => a (way to itself)
- Associativityh->(g->f)=(h->g)->f
- Determinism

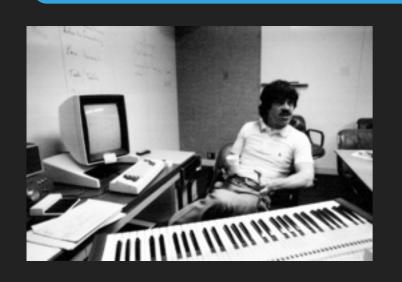
### **OOP FEATURES**

- Composing:
  - bind cohesive things together,
  - context functions (methods)
- Abstracting: hide details, expose interface

## **OOP DRAWBACKS**

- Sharing data
- Mutation
- Data racing

THE LAST THING YOU WANTED ANY PROGRAMMER TO DO IS MESS WITH INTERNAL STATE EVEN IF PRESENTED FIGURATIVELY. INSTEAD, THE OBJECTS SHOULD BE PRESENTED AS SITE OF HIGHER LEVEL BEHAVIORS MORE APPROPRIATE FOR USE AS DYNAMIC COMPONENTS. IT IS UNFORTUNATE THAT MUCH OF WHAT IS CALLED "OBJECT-ORIENTED PROGRAMMING" TODAY IS SIMPLY OLD STYLE PROGRAMMING WITH FANCIER CONSTRUCTS. MANY PROGRAMS ARE LOADED WITH "ASSIGNMENT-STYLE" OPERATIONS NOW DONE BY MORE EXPENSIVE ATTACHED PROCEDURES.



Alan Kay, The Early History of Smalltalk

# **OOP PRINCIPLES**

- Encapsulation?
- ▶ Inheritance?
- Polymorphism?

# COMPOSITIONS, MONADS AND FUNCTORS

- Why Monads?
- ▶ B/C we can!

# MONADS IRL

- Promise
- Pipelines
- Observable streams

# FRP CONCEPTS

- Event-Driven
- Continuous data-flow
- Immutable
- Pure-functional