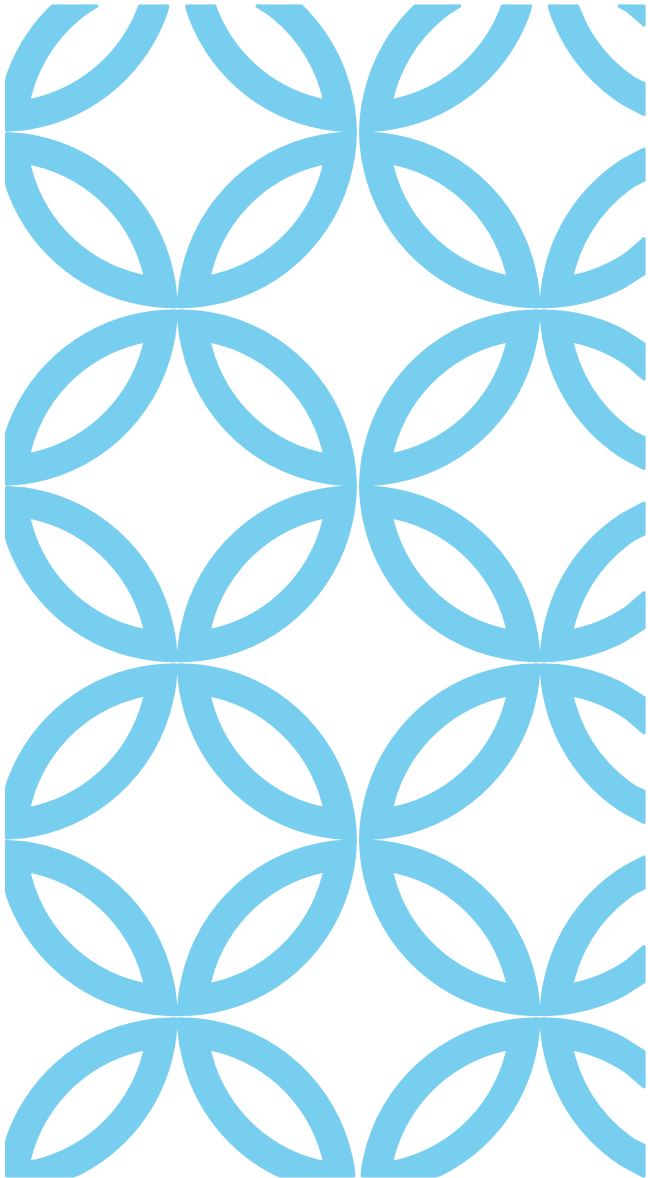


DESIGN PATTERNS AND FUNCTIONAL PROGRAMMING

OO Patterns in FP

Siva Jayaraman

https://github.com/purefunctions/sdfp_oo_fp_design_patterns



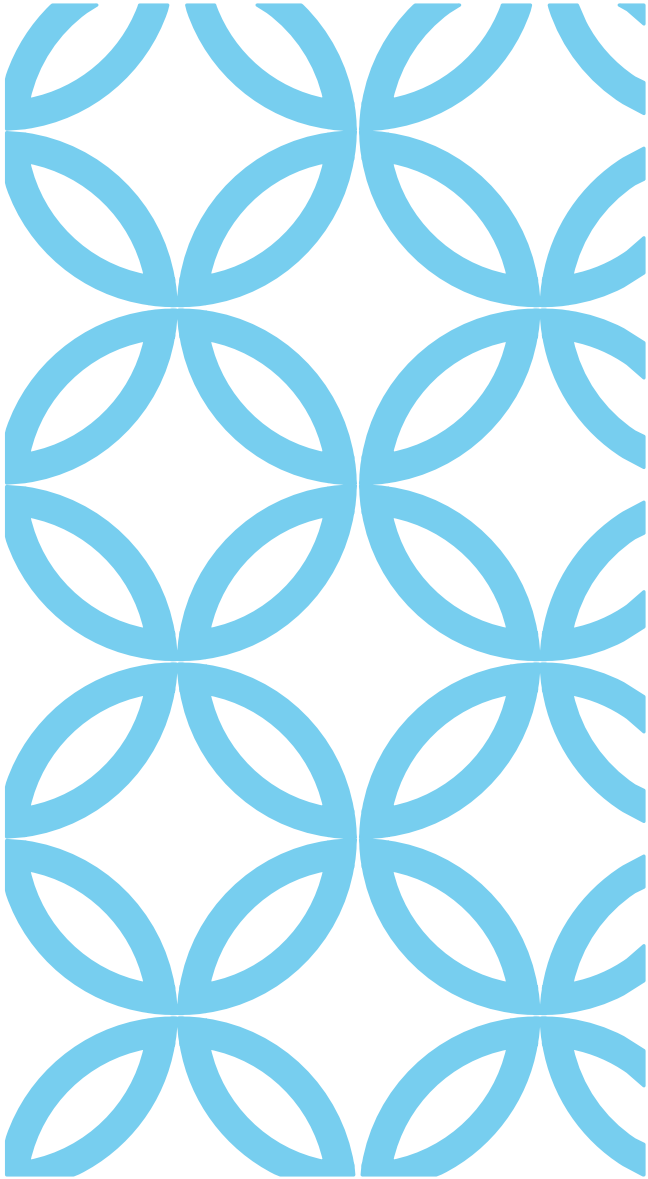
Overview

OO Design patterns & FP equivalents

Beyond OO Patterns

CONTENTS

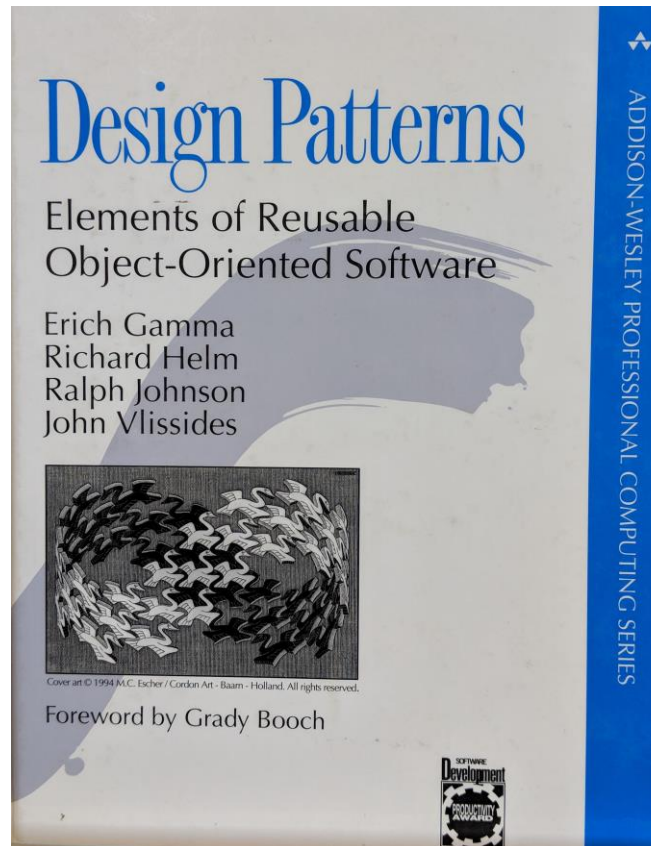




OVERVIEW

DESIGN PATTERNS

Gang of Four

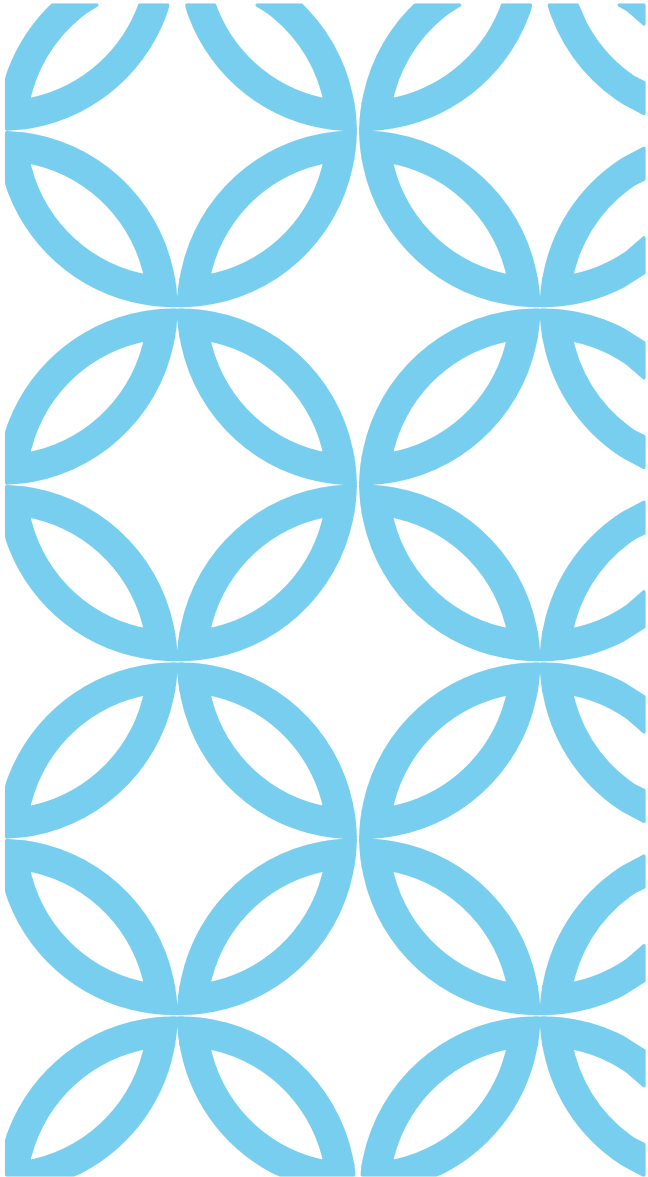


The background of the slide is a grayscale image of a highly ornate, circular ceiling or dome. It features concentric rings of intricate carvings, including floral and leaf motifs. In the center, there is a circular medallion containing a small, glowing white sphere.

DESIGN PATTERNS

“A pattern describes a problem which occurs over and over again, and then describes the core solution to that problem in such a way that you can use this solution a million times over, without ever doing it the same way twice”

- Christopher Alexander



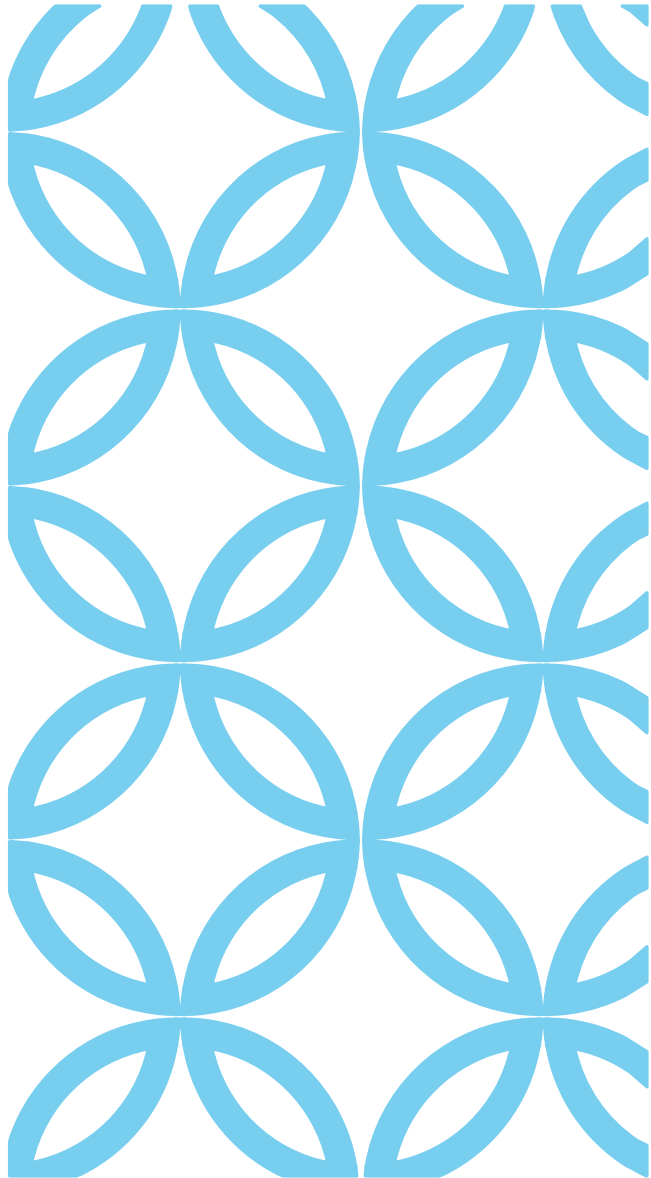
OO PATTERNS & FP EQUIVALENTS

FP EQUIVALENTS

OO	FP
SOLID	Functions
Strategy pattern	Functions
Visitor pattern	More functions
Decorator pattern	Function composition
Dependency injection	Functions
Chain of responsibility	Functions
Adapter	Functions

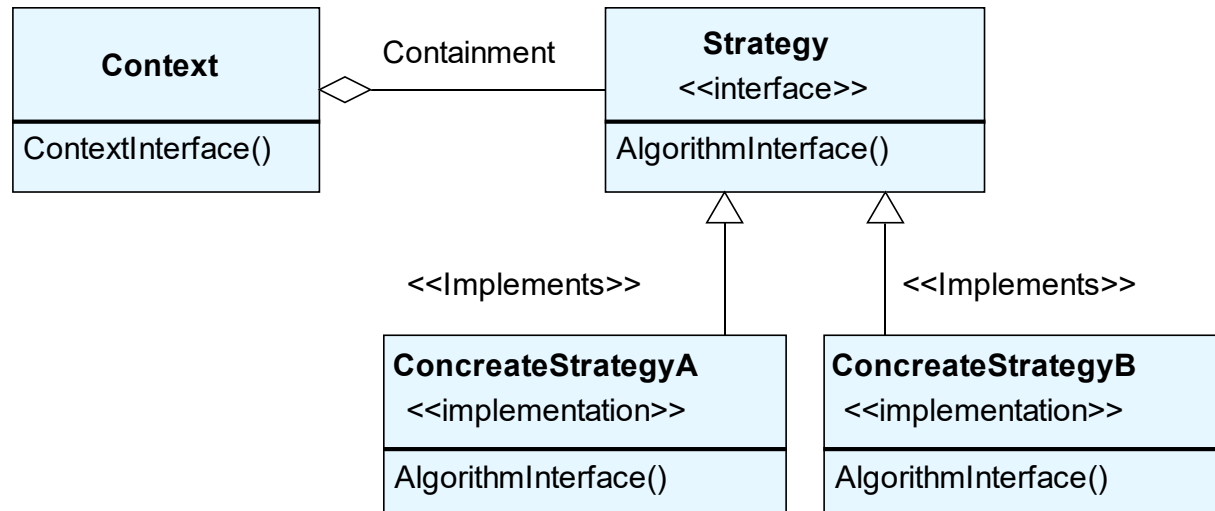


THANK YOU



3 PATTERNS IN 3 LANGUAGES

STRATEGY PATTERN



Define a family of algorithms, encapsulate each one, and make them interchangeable. Strategy lets the algorithm vary independently from the clients that use it.

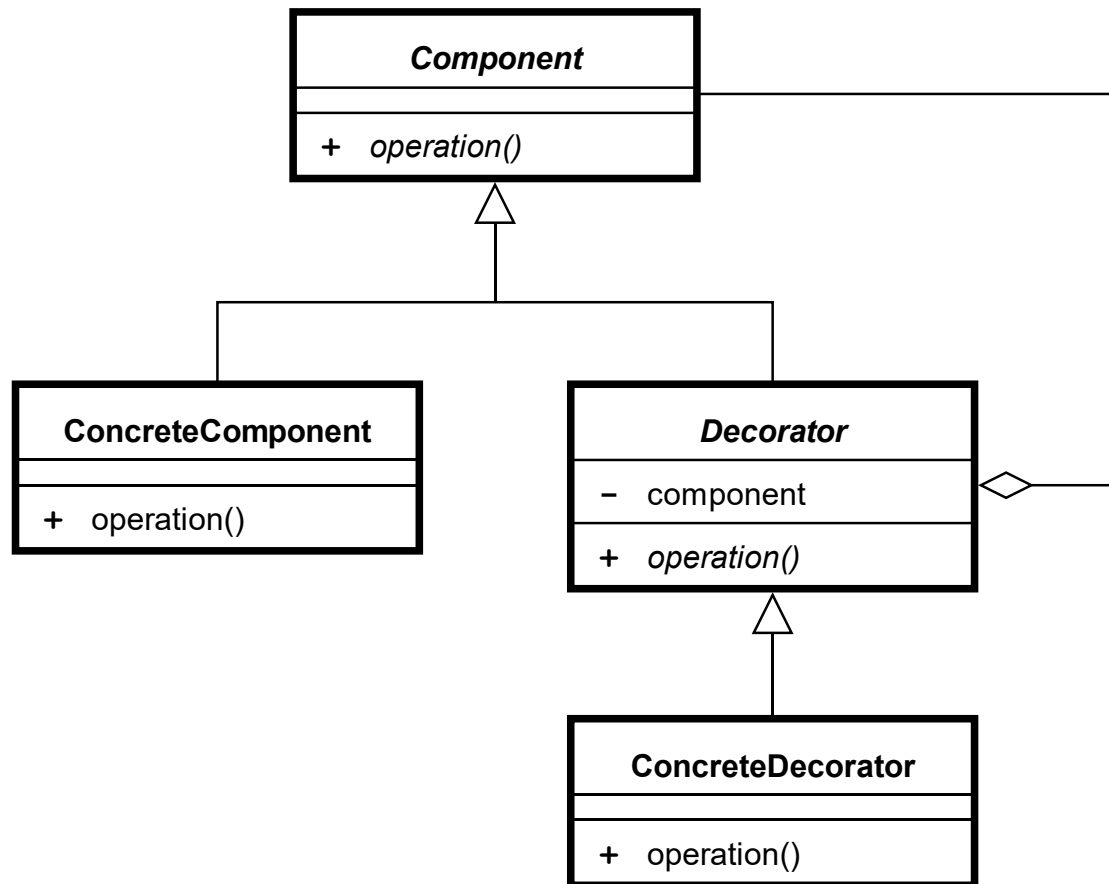
The way it is defined, the strategy can be changed at run time (important for compiled languages)



STRATEGY PATTERN

Code examples in Java, Clojure & Haskell...

DECORATOR PATTERN



Attach additional responsibilities to an object dynamically. Provides a flexible and dynamic way alternative to sub-classing to extend functionality



DECORATOR PATTERN

Code examples in Java, Clojure & Haskell...

THE EXPRESSION PROBLEM...

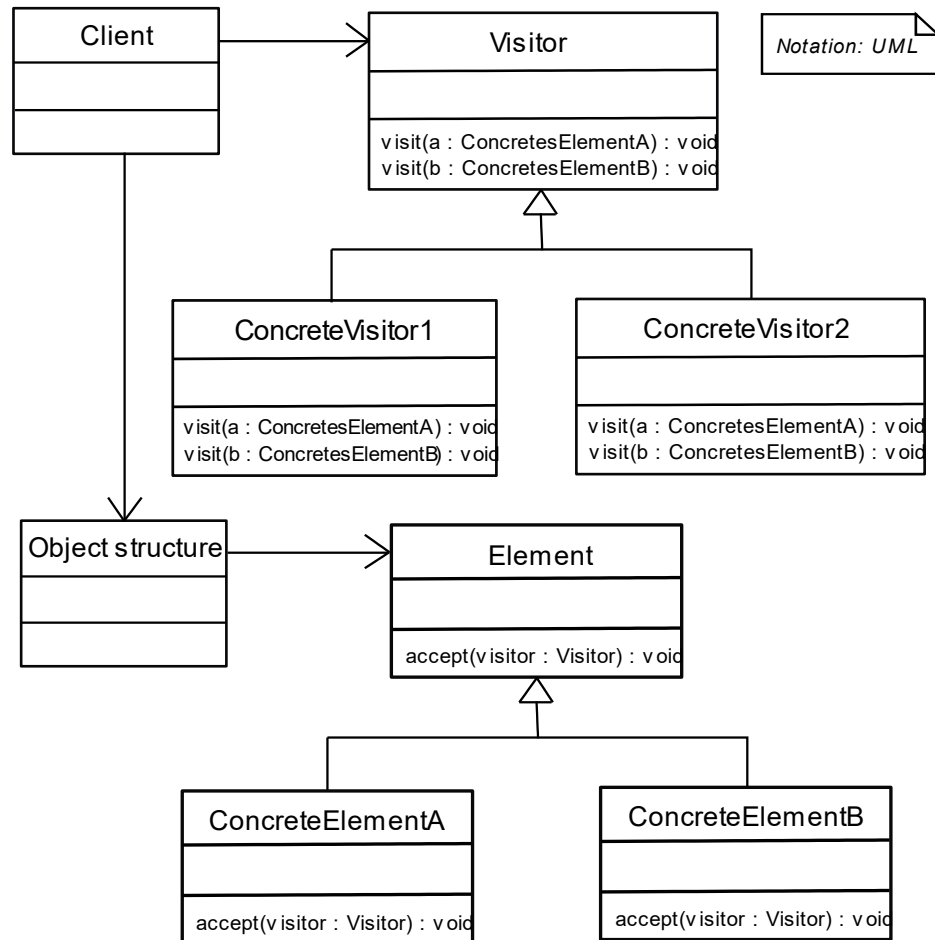
In an Object Oriented Language

	Insert	Lookup	Delete	Size
OrderedMap	Existing implementations			
HashMap				
YourCoolNewMap	Your implementations			

In structured programming language

	Insert	Lookup	Delete	Size	Your new op
OrderedMap	Existing Implementations				Your Implementations
HashMap					

VISITOR PATTERN



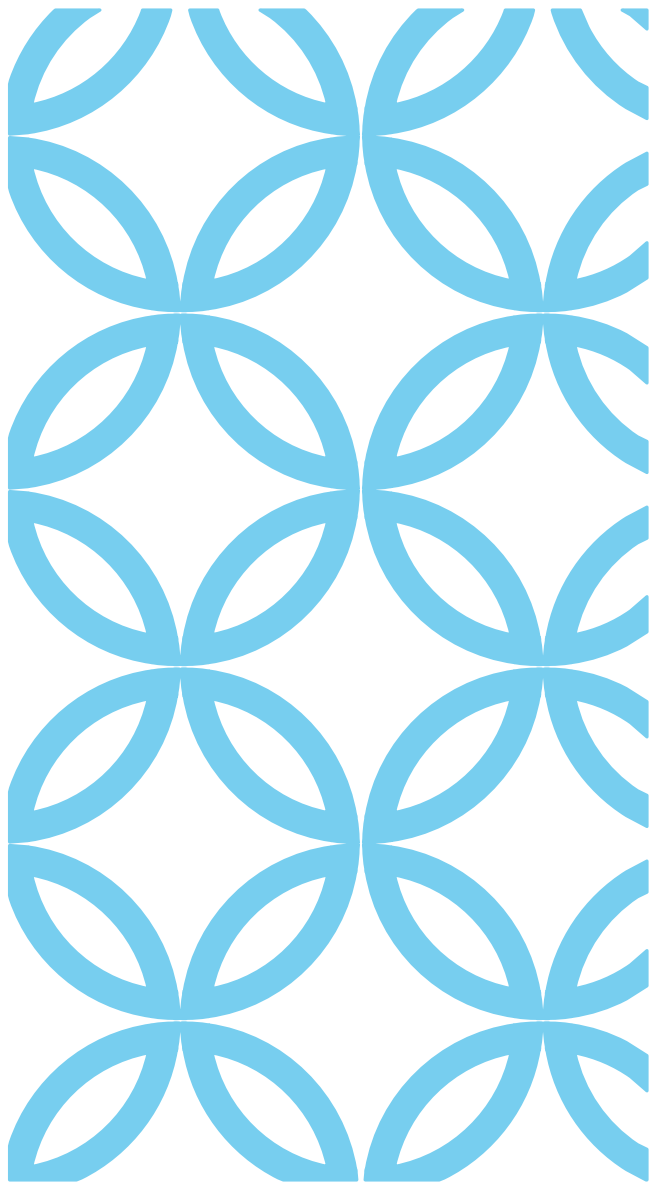
Visitor pattern lets you define a new operation without changing the class of the elements on which it operates

(Does it by inversion of control)



VISITOR PATTERN

Code examples in Java, Clojure & Haskell...



BEYOND OO PATTERNS

DON'T THINK IN OO PATTERNS

For some other
day

Functions, functions... seriously, functions!

Functions in the small and functions in the large

Tail Recursion / Mutual Recursion

Partial function application / Closures

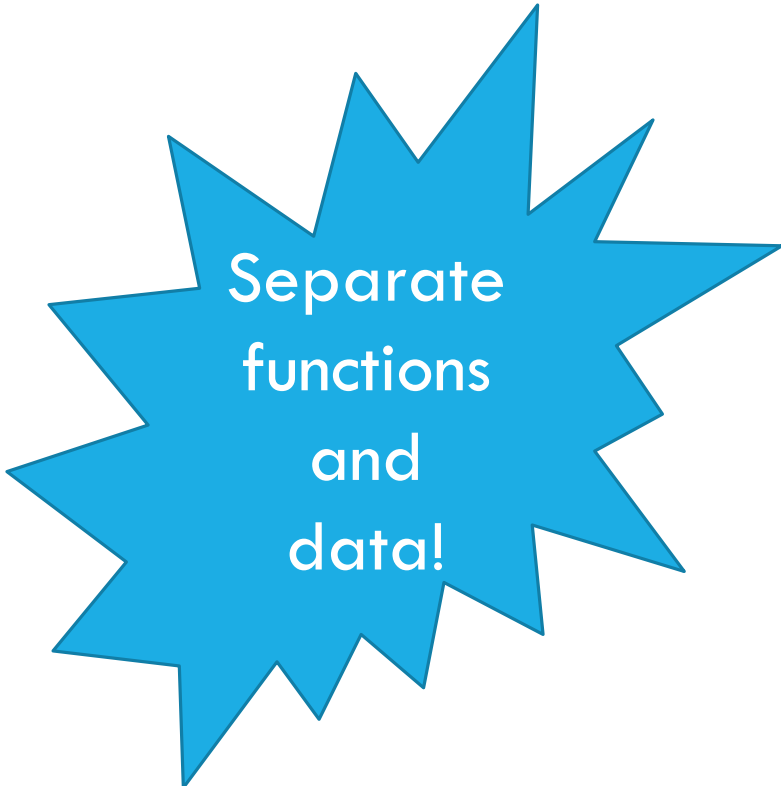
Function Composition

Controlled Mutation, enabling easy concurrency

Lazy collections

Pattern Matching

Functors, Monoids, err.. Monads



Separate
functions
and
data!