Preface, an opiniated library for *functional programming* in OCaml

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Plan

- What is **Preface**
- Why it was designed
- Some design choices
- A note about effect handlers
- Conclusion

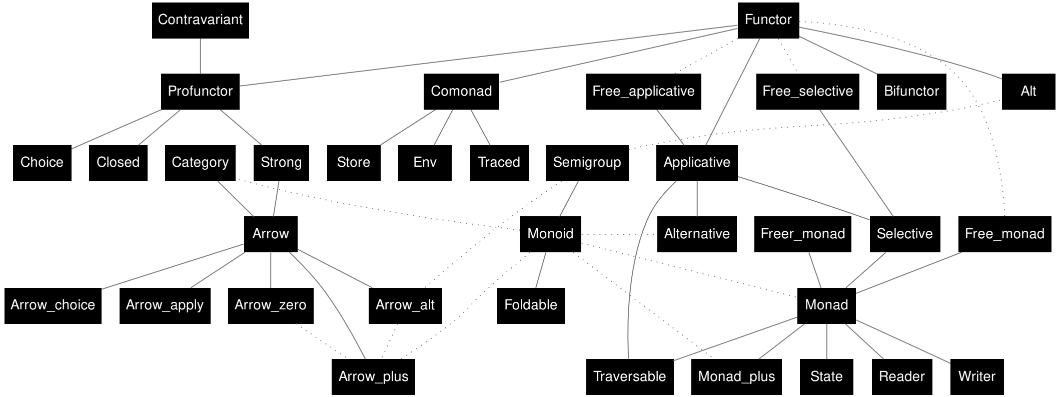
What is Preface

What is Preface

*Preface is an **opinionated** library designed to facilitate the handling of recurring **functional programming idioms** in **OCaml**. Many of the design decisions were made in an attempt to calibrate, as best as possible, to the OCaml language. Trying to get the most out of the module language. The name "preface" is a nod to "Prelude".*

What is Preface

- Github repo - *https://github.com/xvw/preface*
- Documentation - *https://ocaml-preface.github.io/preface/index.html*
- ~**500** commits
- ~**2** years on our free time
- **3 major contributors**, 1 additional contributor
- ~**35** abstractions
- ~**20** implementations


Contravariant
Functor
Profunctor
Comonad
Free_applicative
Free_selective
Bifunctor
Alt
Choice
Closed
Category
Strong
Store
Env
Traced
Semigroup
Applicative
Arrow
Monoid
Alternative
Freer_monad
Selective
Free_monad
Arrow_choice
Arrow_apply
Arrow_zero
Arrow_alt
Foldable
Monad
Arrow_plus
Traversable
Monad_plus
State
Reader
Writer

With the help of

- **Gabriel Scherer**: early draft of the *modular breakdown*
- **Andrey Mokhov**: *Applicative Selective Functor*
- **Florian Angeletti**: tricky quantification
- **Oleg Kiselyov**: advices about *Freer Monad*
- **XHTMLBoy**: fixing *Freer monad*, *Free Applicative* and *Free Selective*
- **Pierre-Evariste Dagand**: help with Arrows

Why it was designed

An *almost* true story

- You find a nice article that elegantly implements a boring problem

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Except if you use Preface!

With **Preface**, a lot of the machinery is derivable, relying on modules instead of typeclasses.

More seriously

- In OCaml, common functional abstraction (like Monad or Applicative) are buried in the heart of certain libraries/projects:
  - Lwt (Monad)
  - Cmdliner (Applicative)
  - Dune (Selective)
  - Bonsai (Arrow)

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- So we decided to pool our efforts to have a basis for each new project

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*Even our goal was to **fit on the semantic of OCaml**, Haskell was a great source of inspiration.*

Difficulties from Haskell translation

- Lack of typeclasses (which introduces the **modular breakdown**)
- Higher Kinded polymorphism only allowed in module language
- No partial application on kind (ie: `Either a b` can't be treated as `Either a`)

Modular Breakdown

Preface is cutting in 4 modules

- `Core`: Helpers
- `Specs`: type description
- `Make`: Functor (in *ml sense*) taking interfaces defined in `Specs` and producing modules constrained by `Specs`
- `Stdlib`: some concrete implementation

Modular breakdown from
https://github.com/xvw/preface/blob/master/guides

Specialization of type with different arities (ie: `Either a b` can't be treated as `Either a`)

Translating Typeclasses constraints into first class modules or functor (see `Foldable` and `Store`)

A side note on effect system

Conclusion