Categories in the wild

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Naked interface

```
trait Cassandra {
  def prepare(statement: String): PreparedStatement
  def prepare(statement: RegularStatement): PreparedStatement
  def execute(statement: String): Unit
  def execute(statement: Statement): Unit
}
```

Wrapped interface

```
trait Cassandra {
  def prepare(statement: String): F[PreparedStatement]
  def prepare(statement: RegularStatement): F[PreparedStatement]
  def execute(statement: String): F[Unit]
  def execute(statement: Statement): F[Unit]
}
```

Map

```
map: (X => Y) => F[X] => F[Y]

// map((x: X) => x)(y) === y
// map(f)(map(g)(y)) === map((x: X) => f(g(x)))(y)
```

Functor

Zip

```
zip: (F[X],F[Y]) => F[(X,Y)]

// map(_._1)(zip(fx, fy)) === fx
// map(_._2)(zip(fx, fy)) === fy
// zip(map(_._1)(z),map(_._2)(z)) === z
```

Unit

```
unit: X => F[X]

// map(f)(unit(x)) === unit(f(x))
```

Applicative functor

```
map: (X => Y) => F[X] => F[Y]
zip: (F[X],F[Y]) => F[(X,Y)]
unit: X => F[X]
```

Bind

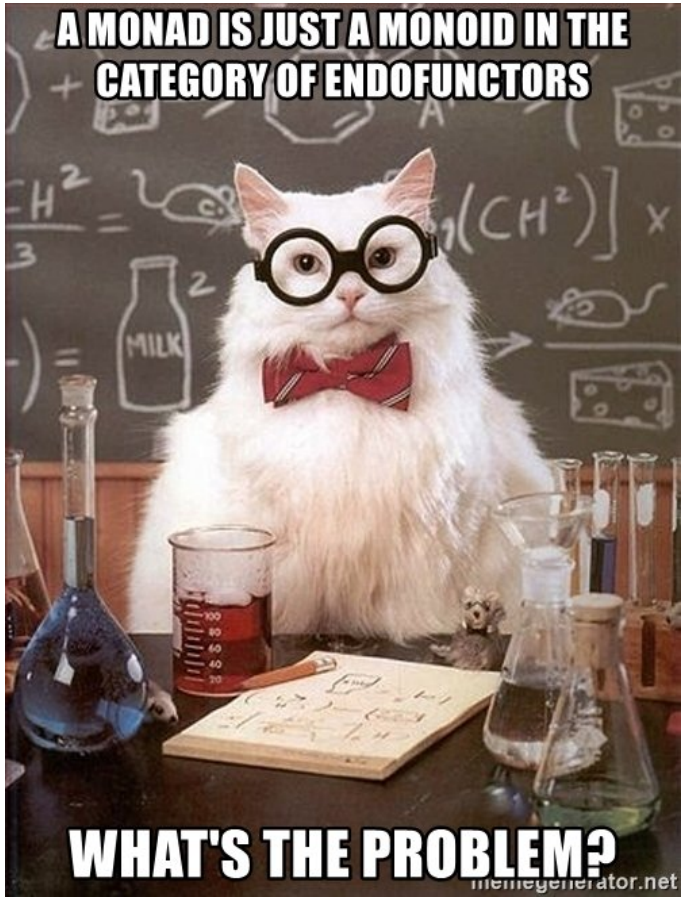
```
bind: (X => F[Y]) => F[X] => F[Y]

// bind(f)(bind(g)(x)) === bind((y: X) => bind(f)(g(y))(x))
// bind(unit)(x) === x
// bind(f)(unit(x)) === f(x)

// map(f)(x) === bind((y: X) => unit(f(y)))(x)
// zip(x,y) === bind((x0: X) => map((y0: Y) => (x0, y0)))
```

Monad

```
unit: X => F[X]
bind: (X => F[Y]) => F[X] => F[Y]
```



Demo

Summary

‘functor’, ‘applicative functor’ and ‘monad’ specify interfaces that handle callbacks, in increasing power