Lenses LOL

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ABSTRACT

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Chapter 1

Introduction

a complicated running example that we can simplify to show bits and pieces of unsatisfactory solutions, etc.

A bowling league keeps statistics about its members. They keep a lot of details, but want to put a splash on their wiki congratulating players who achieved a very high score that week. For simplicity, let's say "a lot of details" means just two details, one of which they want to appear on the website and one not. For example:

Name	Top Score This Week	Mean Score All Time
Alexis	278	258
Billie	275	260
Casy	262	254
Dana	262	255
Eddie	251	255
Frankie	231	249

On their website, they show players with scores over 275:

Alexis	278
Billie	275

The next week, everybody scores identically (so I don't have to exhaust my internal random number generator!), except Casey has an exceptionally good week:

Name	Top Score This Week	Mean Score All Time
Alexis	278	258
Billie	275	260
Casy	283	254
Dana	262	255
Eddie	251	255
Frankie	231	249

The wiki updates correspondingly:

Alexis	278
Billie	275
Casy	283

This gives Casey a chance to notice that his name is spelled incorrectly. He updates the wiki, and, we might hope, the league's records update accordingly.

Ways this example can be extended to show off particular problems:

1. This example isn't yet, but could become, a good example for the alignment problem: perhaps the ordering could change to maintain the "sorted-by-top-score" invariant so that positional alignment isn't a good solution, and the name-change means that key-based alignment isn't a good solution.

2. Suppose the wiki linked from members' names to a personal wiki page (with a bio or some such thing). In this scenario, each repository has data that the other doesn't, which could be a good motivation for symmetric lenses.

3. As the connection between the wiki and the league records grows features like the previous one, the motivation for composition gets more and more clear: you want to specify the transformation in chunks (clear out the mean score data, add personal links, only keep people with a certain minimum score) that combine together to do what you want.

4. Some discussion of how the league records are stored and how the wiki is stored could lead into the disconnect between algebraic structures and instantiations that I've been struggling with for the past few years.

Chapter 2

Background: Asymmetric Lenses

and related work, e.g. view-update problem and friends (?)

Chapter 3

Challenges

information loss

    composition

    alignment

    concrete instantiations

Chapter 4

Symmetric Lenses

information loss + composition

Chapter 5

Edit Lenses

alignment

Chapter 6

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Conclusion