[CSE301 / Lecture 6]
Zippers and derivatives of data types

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Program for today

1. Zippers, through examples
2. Link to differentiation
3. Discussion of the in-class exam

Zippers

Goal: define a pointer into a structured object (e.g., element of a list, node of a tree, etc.) in a way that supports efficient navigation and mutation, in a purely functional way.

Idea: represent the pointer by the value being pointed to, paired with its surrounding context.

Zipper = "one-hole context" + value to plug into the hole

Terminology from "The Zipper" by Gérard Huet (JFP, 1997)

(Let's look at examples...)

Link to differentiation

Slogan: the derivative of a type is its type of one-hole contexts!

(The title of an influential, unpublished paper by Conor McBride.)

Idea underlying this link: that a FO data type may be seen as a kind of polynomial (sum of products of powers), or more generally as a formal power series (infinite sum of products of powers).

(Let's look at examples, on the board...)