Dependent types
CS 152 (Spring 2020)

Harvard University

Tuesday, April 14, 2020

Announcements

- ▶ HW3: Grades released on Gradescope
- ▶ HW4: due today (Apr 14)
- ▶ HW5: will be released today due May 1. Two optional questions
- ▶ Survey responses:
  - ▶ Poor internet connectivity: made lectures downloadable, section recording will be more reliable
  - ▶ OH: will make slight adjustments
  - ▶ Have reached out individuals; get in touch if you'd like to chat
- ▶ Feedback is always welcome!!!! Email or post on Piazza...
  - ▶ If you have any issues that are affecting your ability to learn/succeed in CS152 or other courses, please let us know!

Today, we will learn about

- Dependent types
  - Motivation: reasoning precisely about vectors
  - LF type system

Dependent types: motivation

First attempt at type system

Issues

LF (Logical Framework)

Judgment for Expressions: $\Gamma \vdash e : \tau$

Judgment for Types: $\Gamma \vdash \tau :: K$

Judgment for Kinds: $\Gamma \vdash K$ ok

Judgments for equivalence

- See notes
  - $\Gamma \vdash e_1 \equiv e_2 : \tau$
  - $\Gamma \vdash \tau_1 \equiv \tau_2 :: K$
  - $\Gamma \vdash K_1 \equiv K_2$

Back to vectors...