

Final Review

15-814 Types and Programming Languages
Frank Pfenning, Fall 2019

First Half

- Basics: The λ -calculus
- Types & type safety
 - Substitution & Canonical Forms
 - Preservation & Progress
- Data representation (\times , 1 , $+$, ρ)
- Functional computation (\rightarrow , $\&$)
- Exceptions

Second Half

- The Curry-Howard correspondence (propositions as types, proofs as programs)
- Richer types and stronger properties
 - Parametric polymorphism and data abstraction (\forall , \exists)
 - Linearity and accounting for resources (no garbage, messages) (\otimes , 1 , \oplus , ρ , $\&$, \multimap)
- Different models of computation
 - K machine: from global to local, continuations
 - Concurrency: multi-local (shared memory or message-passing)
 - Mutable memory