

February 1, 2010

Programming Languages and Types

Group Exercise 13

G13.1 Existential Types

1. Existentials can be encoded as universals. How?
2. What must we prove to be confident that this encoding of existentials is correct?
3. To which theorem is the encoding related under the Curry-Howard isomorphism?

G13.2 Higher-Order Types

1. What is the difference in meaning between the type-level expressions $\forall X.X \rightarrow X$ and $\lambda X.X \rightarrow X$?
2. Why doesn't an arrow type like $\text{Nat} \rightarrow \text{Nat}$ have an arrow kind like $* \Rightarrow *$?

G13.3 Type Equivalence

Why do we need a formalization of type equivalence in System F_ω ?

Suppose we add to the type equivalence relation one of the following rules. Which, if any, of the basic properties of the system would fail?

1. $T \rightarrow T \equiv \forall X :: *.T$
2. $S \rightarrow T \equiv T \rightarrow S$