WORK LOG OF JUNE 11 2025

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Existence types are defined (by Pierce) as

$$\exists X.T := \forall Y.(\forall X.T \to Y) \to Y.$$

We can provide the following *informal* validation of it in terms of classical logic:

$$\begin{aligned} \exists X.T \vdash \\ \neg(\forall X.\neg T) \vdash \\ \neg(\forall X.\neg T \vee Y) \vee Y \vdash \\ (\forall X.T \to Y) \to Y \vdash \\ \forall Y.(\forall X.T \to Y) \to Y \end{aligned}$$

1. COMMENTS

- Realized that the singleton type family `SNat n` makes the `Nat` kind inhabitted.
- I propose attempting to use **where** syntax to improve the current readability given by **let** bindings.