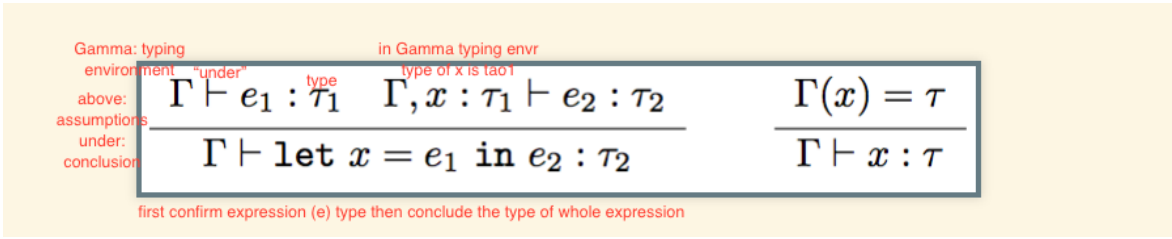
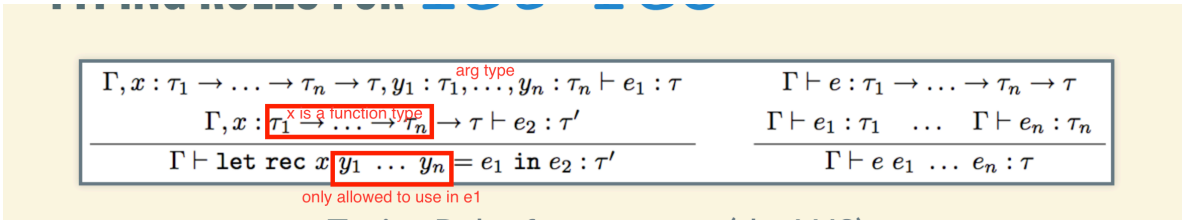
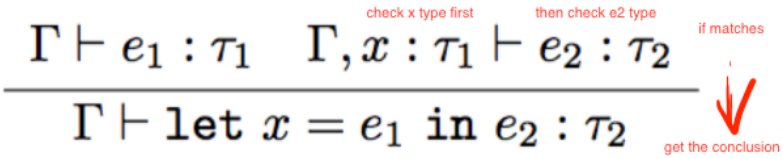
DAY 6 FP


Gamma: typing environment
above: assumptions
under: conclusion
"under"
type
in Gamma typing envr
type of x is tao1
$\frac{\Gamma \vdash e_1 : \tau_1 \quad \Gamma, x : \tau_1 \vdash e_2 : \tau_2}{\Gamma \vdash \texttt{let } x = e_1 \texttt{ in } e_2 : \tau_2} \qquad \frac{\Gamma(x) = \tau}{\Gamma \vdash x : \tau}$
first confirm expression (e) type then conclude the type of whole expression


arg type
x is a function type
$\frac{\Gamma, x : \tau_1 \to \ldots \to \tau_n \to \tau, y_1 : \tau_1, \ldots, y_n : \tau_n \vdash e_1 : \tau \qquad \Gamma, x : \tau_1 \to \ldots \to \tau_n \to \tau \vdash e_2 : \tau'}{\Gamma \vdash \texttt{let rec } x\ y_1\ \ldots\ y_n = e_1 \texttt{ in } e_2 : \tau'} \qquad \frac{\Gamma \vdash e : \tau_1 \to \ldots \to \tau_n \to \tau \qquad \Gamma \vdash e_1 : \tau_1 \quad \ldots \quad \Gamma \vdash e_n : \tau_n}{\Gamma \vdash e\ e_1\ \ldots\ e_n : \tau}$
only allowed to use in e1


check x type first
then check e2 type
if matches
get the conclusion
$\frac{\Gamma \vdash e_1 : \tau_1 \quad \Gamma, x : \tau_1 \vdash e_2 : \tau_2}{\Gamma \vdash \texttt{let } x = e_1 \texttt{ in } e_2 : \tau_2}$