Language Transformation: Adding Subtyping

### #1: split equality

```plaintext
for each typing rule with conclusion Gamma |- (op es) : typ :
let (newPremises, map) = split_equal_types premises in
newPremises
+
(for each key T in map:
  if map.lookup(T) contains a contravariant type T1 then
    T2 <: T1 for all T2 in map.lookup(T)
  else if map.lookup(T) contains all covariant types then
    T1 <: T2 for all T1, T2 in map.lookup(T) if T1 occurs first of T2
  else if map.lookup(T) contains all invariant types then
    T1 = T2 for all T1, T2 in map.lookup(T)
  else T = T1 U T2 U ... Tn where map.lookup(T) = T1, T2, ... Tn
)
```

### #2: subtyping based on variance

U is the join operator between types
split_equal_types takes in input a list of premises and returns a pair (newPremises, map) where:
- newPremises is the same set of premises premises in which types that have been mentioned more than once are given a new variable name. The first occurrence of a variable that occurs multiple time is unchanged.
- map contains a map from the variable that has been replaced to the variables that have replaced the variable.

Example: split_equal_types applied to premises

\[ \Gamma |- e_1 : T_1 \rightarrow T_2 \text{ and } \Gamma |- e_2 : T_1 \]

returns

\[ \text{newPremises} = \Gamma |- e_1 : T_3 \rightarrow T_2 \text{ and } \Gamma |- e_2 : T_4 \]

\[ \text{map} = T_1 \rightarrow [T_3, T_4] \]
\[
\begin{align*}
\text{Gamma} & \vdash e_1 : \text{T} \rightarrow \text{T} \\
\text{Gamma} & \vdash e_2 : \text{T} \\
\text{-------------} \\
\text{Gamma} & \vdash \text{app } e_1 \ e_2 : \text{T} \\
\end{align*}
\]

\[
\begin{align*}
\text{Gamma} & \vdash e_1 : \text{T} \rightarrow \text{T} \\
\text{Gamma} & \vdash e_2 : \text{T} \\
\text{T} & \vdash e_2 : \text{T} \\
\text{-----------} \\
\text{Gamma} & \vdash \text{app } e_1 \ e_2 : \text{T} \\
\end{align*}
\]

\[
\begin{align*}
\text{Gamma} & \vdash e_1 : \text{Bool} \\
\text{Gamma} & \vdash e_2 : \text{T} \\
\text{-------------} \\
\text{Gamma} & \vdash \text{if } e_1 \ e_2 \ e_3 : \text{T} \\
\end{align*}
\]

\[
\begin{align*}
\text{Gamma} & \vdash e_1 : \text{Bool} \\
\text{Gamma} & \vdash e_2 : \text{T} \\
\text{-------------} \\
\text{Gamma} & \vdash \text{if } e_1 \ e_2 \ e_3 : \text{T} \\
\end{align*}
\]