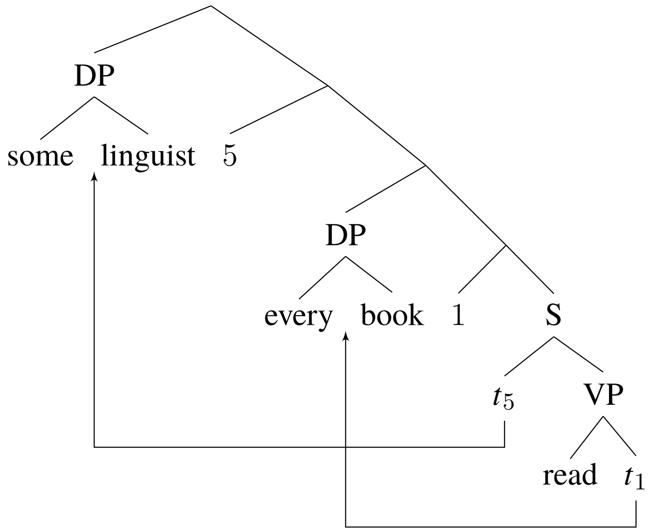
1 Surface Scope Reading

Compute the denotation of (1) (and make sure that the surface scope reading is derived).

(1)



We assume the following type-$\langle et, \langle et, t\rangle\rangle$ meanings for the quantificational determiners. You can use either the function or set version of entries.

(2) a. $[\![\text{every}]\!]^{a,M} = [\lambda f \in D_{et}.[\lambda g \in D_{et}.\ 1 \text{ iff for every } x \in D_e \text{ such that } f(x) = 1, g(x) = 1]]$
$= [\lambda f \in D_{et}.[\lambda g \in D_{et}.\ 1 \text{ iff } \mathsf{set}(f) \subseteq \mathsf{set}(g)]]$

b. $[\![\text{some}]\!]^{a,M} = [\lambda f \in D_{et}.[\lambda g \in D_{et}.\ 1 \text{ iff for some } x \in D_e \text{ such that } f(x) = 1, g(x) = 1]]$
$= [\lambda f \in D_{et}.[\lambda g \in D_{et}.\ 1 \text{ iff } \mathsf{set}(f) \cap \mathsf{set}(g) \neq \varnothing]]$

You have to use the new version of Predicate Abstraction twice.

(3) *Predicate Abstraction* (new ver.):
for any model M, for any assignment function a and for any index $i \in \mathbb{N}$,

$$\left[\!\!\left[\begin{array}{c} \wedge \\ i \quad \text{A} \end{array} \right]\!\!\right]^{a,M} = \left[\lambda x \in D_e.\ \left[\!\!\left[\text{A} \right]\!\!\right]^{a[i \to x],M} \right]$$

You will use this rule twice in the computation. Recall that if g is an assignment function, $g[i \to x]$ is the assignment function that differs from g at most in that $g(i) = x$. And g itself could be already modified, e.g. $h[1 \to \text{Paris}][8 \to \text{London}]$ is the assignment function that differs from $h[1 \to \text{Paris}]$ at most in that $h[1 \to \text{Paris}][8 \to \text{London}](8) = \text{London}$.

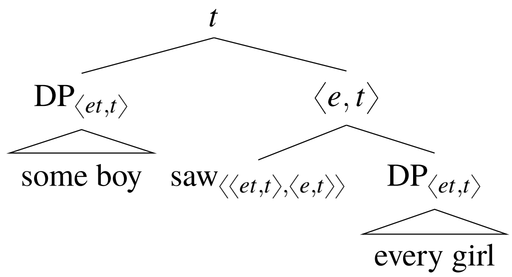
2 (Optional) Type-Shifting (this exercise is difficult)

We adopted the hypothesis that quantificational DPs can covertly move in order to solve the type-mismatch. However, there is an alternative analysis that does not involve movement.
Recall that we have a type-mismatch on the assumption that transitive verbs like 'saw' are of type $\langle e, et\rangle$, as they cannot combine with a quantificational DP of type $\langle et, t\rangle$.

(4) $[\![\text{saw}]\!]^{a,M} = [\lambda x \in D_e.\ [\lambda y \in D_e.\ 1 \text{ iff } y \text{ saw } x \text{ in } M]]$

What if we are wrong about this assumption, and 'saw' is actually of type $\langle\langle et,t\rangle,\langle e,t\rangle\rangle$? We won't have a type-mismatch, as shown in (5).

(5)



As for proper names, recall from Assignment 7 that they can be analyzed as Generalized Quantifiers too, e.g. $[\![\text{John}]\!]^{a,M} = [\lambda f \in D_{\langle e,t\rangle}.\ f(\text{John}) = 1]$, so transitive verbs of type $\langle\langle et,t\rangle,\langle e,t\rangle\rangle$ can have them in object position.
So if transitive verbs are actually of type $\langle\langle et,t\rangle,\langle e,t\rangle\rangle$, we won't need QR. Propose a type-$\langle\langle et,t\rangle,\langle e,t\rangle\rangle$ denotation for 'saw'. Note that as before, you want 'John saw Mary' to denote 1 in M iff John saw Mary in M.

(6) $[\![\text{saw}]\!]^{a,M} = [\lambda Q \in D_{\langle et,t\rangle}.\ [\lambda x \in D_e.\ 1 \text{ iff ???}]]$