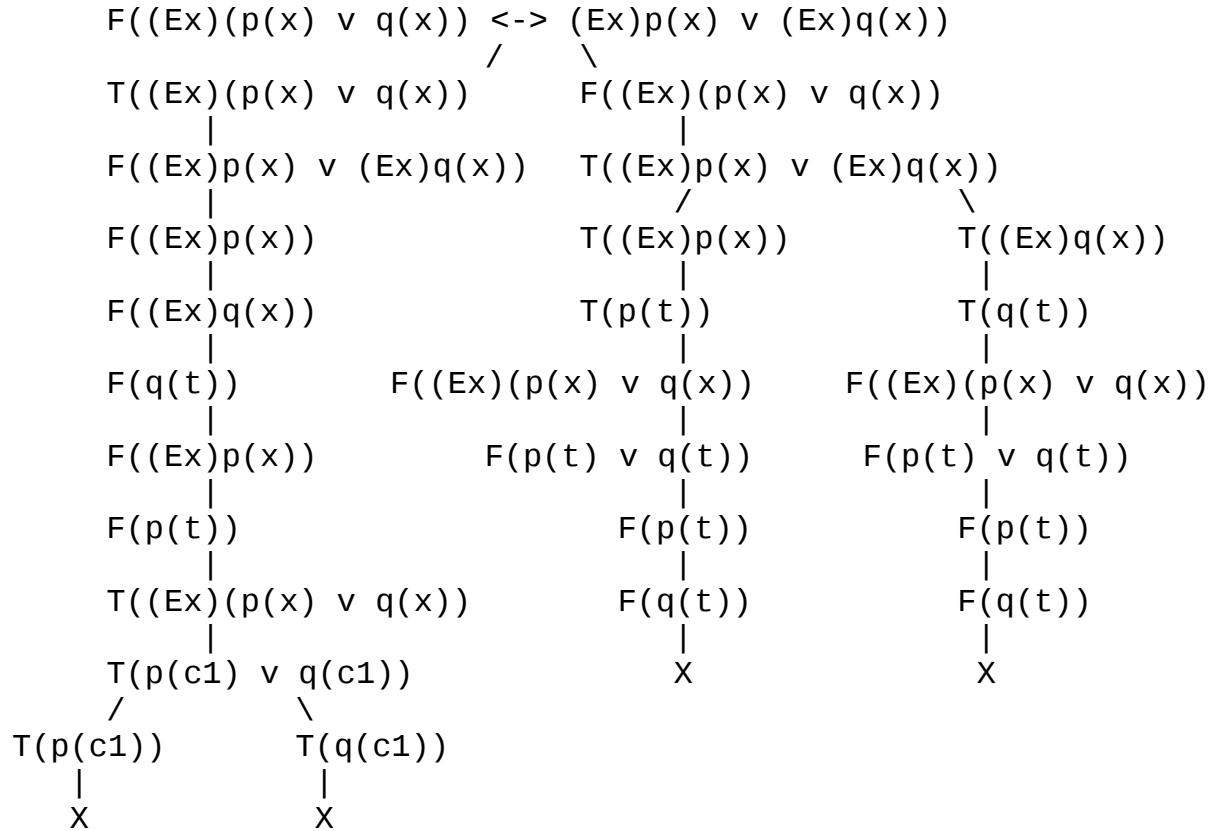
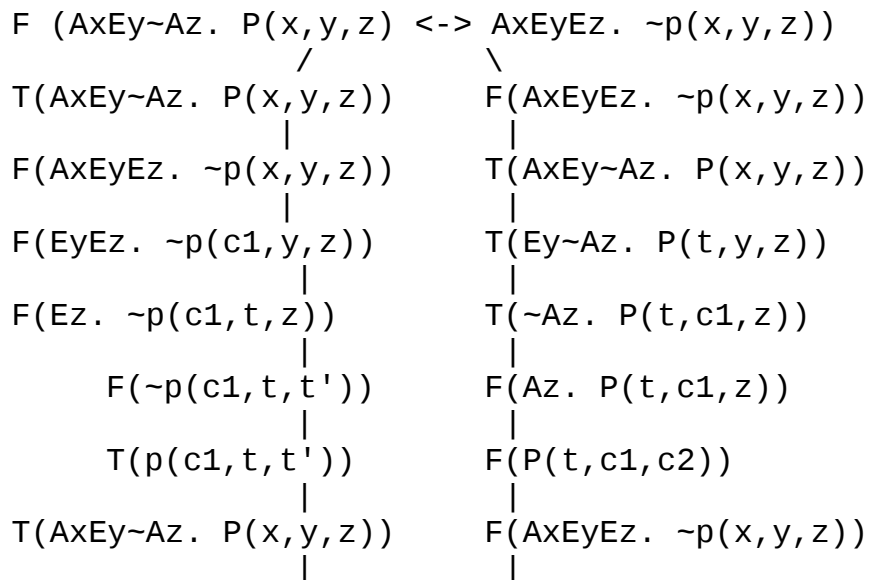
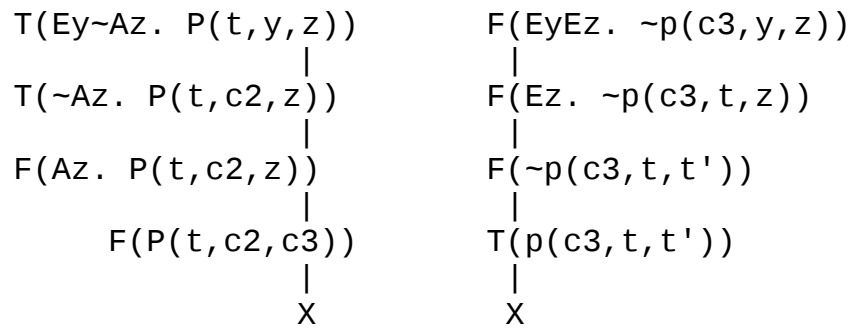


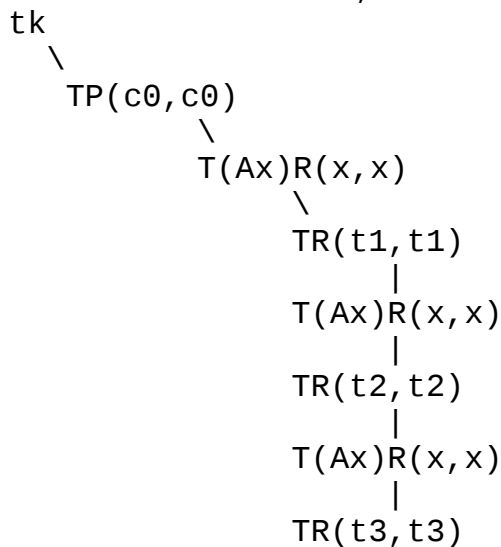
Logic for Applications
(Ch 6) P 118: 1, 12a, 15
(Ch 7) P 125: 1, 6

1.

12.
(a)

**15.**

Is prop 6.10 saying that if we have a non-contradictory entry, we extend it to $n+1$ levels, its entry becomes reduced? How?

**Ch. 7****1.**

->

For all means that we can take any term n in our language and use them for the parameters in the functions and predicates in our scope (p 85) for all structures. If we extend L to include new constants $c1, c2 \dots cn$, then the forall will encompass them as well.

<-

The constants $c1, c2 \dots cn$ were not in the structure L , so they extend L . Again, the forall quantifier refers to any term in *any* structure, so that $c1, c2 \dots cn$ are included within that quantifier.

6.

By 7.8, the soundness and completeness theorems, we know (i) and (iii) to be equivalent. We also know (ii) and (iv) to be equivalent. We must then prove that (i) and (ii) are equivalent, as well as (iii) and (iv). Semantically $\sigma \models \phi$ states that on the truth of all the premises in σ , then ϕ must be true. $\models \sigma \rightarrow \phi$ states that if we take the conjunction of all the formulas in σ , then ϕ will then be true. If σ is false, then the implication is still trivially true, so it is a tautology. The statement $\sigma \vdash \phi$ is the syntactic version and means that we have an atomic tableau proof of ϕ

with every formula of σ added as an atomic tableau to the tree. $\vdash \sigma \rightarrow \phi$ means that we again make a tableau proof and add each conjunction in σ . According to 6.2b, each conjunctive formula that we add is added in the same way as we did the formulas in $\sigma \vdash \phi$.