Ex 3 · i) $a > b$ as P (where a & b are atomic)
$b \to a$ as q (where i.e.)

then converse of $P = a \to b$
$b \to a$ which equivalent to q

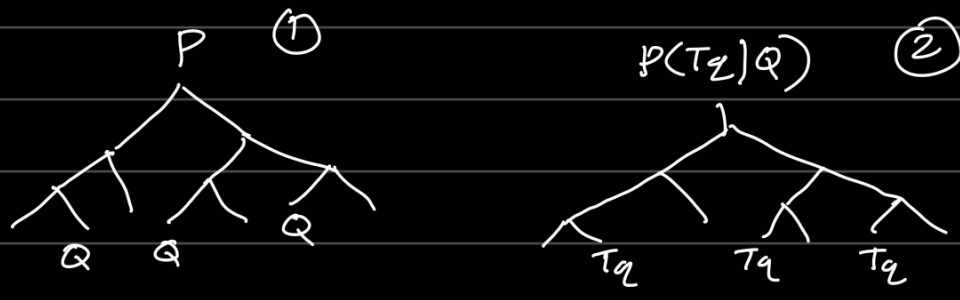
ii) $a \to b$ (where a & b are atomic)
$\neg b \to \neg a$ as q (where a & b ...

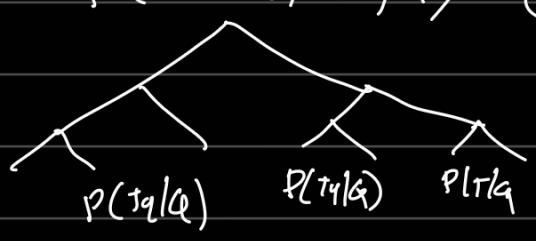
contra positive of P

3) $(P) \vee (q) \vee (R) \vee (\neg P) \vee (\neg q) \vee (\neg R)$
4) $(P) \wedge (q) \wedge (R) \wedge (\neg P) \wedge (\neg q) \wedge (\neg R)$
5) $(P) \wedge (q) \wedge (R)$

5) i) Given
$F_q = q \wedge \neg q$
$V(Fq) = \bot$
$T_q = q \vee \neg q$
$\therefore V(Tq) = T$

ii) $P(Tq/\ ) \models P(P(Tq/q)/Q)$
So we know $v(P(Tq/Q)) = T$ (Assumi)
$v(Tq) = T$ (By definition on question)
Consider a passing of P & $P(Tq/Q)$





By unique readability of propositional form. taking 2 propositional form with same passing tree we will get same valuation for PL if the corresponding atomic form of each tree one same

Here in ② & ③
the ② tree have Tq and if change to $P(Tq/Q)$ in ③ the tree remain same.
we $v(Tq) = T$ and simile for $V(P(Tq/\ ))$
Valuation of $P(P(Tq)Q)/Q$ is T

$\Rightarrow \quad P(T_q|Q) \models P(P(T_q|Q)|Q)$

ii) $P \models P(P(T_q|Q)|Q)$

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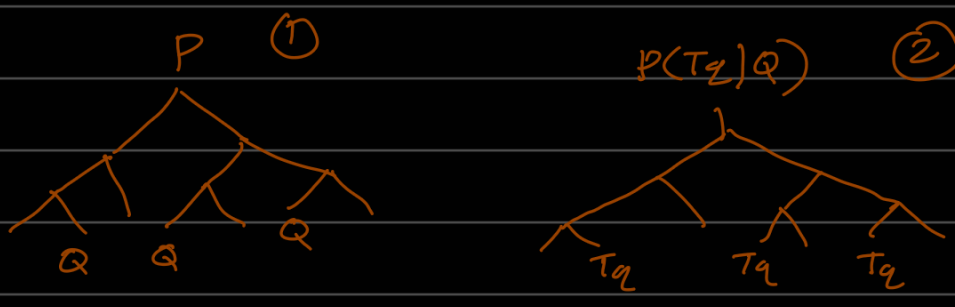
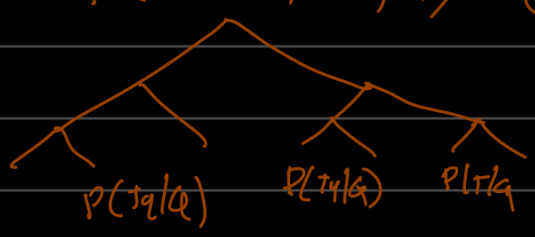


$P(P(T_q|Q)|Q)$ ③



$V(P) = V(P(Q|Q)) = T$

the valuation of Q can be T or ⊥

$V(Q) = T$,

Then $P \models P(P(T_q|Q)|Q)$ Proved by above subquestion as Q is change to T_q which is TRUE will give $P(T_q|Q) = T$

There by $P(P(T_q|Q)|Q) = T$

If $V(Q) = \perp$

Assume $V(P) = T$

$V(P(T_q|Q)$ can be $T, \perp$

Case 1 $V(P(T_q|Q)) = \perp$

$\Rightarrow \quad V(Q) = V(P(T_q|Q) = \perp$

So consider ① & ③ Parsing tree.

$V(Q)$ is changed by $V(P(T_q|Q)$ with same valuation.

$\Rightarrow$ ① & ③ are equivalent

$\Rightarrow \quad P \equiv P(P(T_q|Q)|Q)$

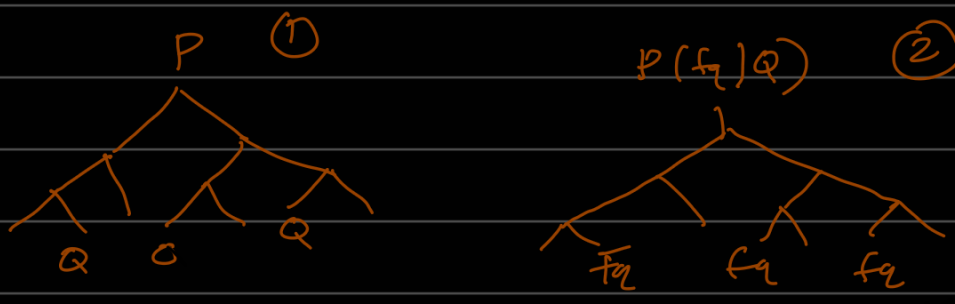
Case 2 $V(P(T_q|Q)) = T$

$\Rightarrow V(Q) = V(P(T_q|Q) = T$

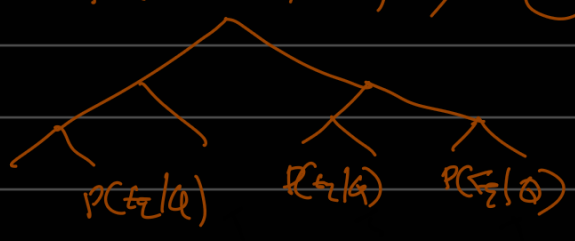
by above $P \equiv P(P(T_q|Q)|Q$

when replace by F_q

g



$P(P(F_q|Q)|Q)$ ③



1) $P(F_q|Q) \not\models P(P(F_q|Q)|Q)$

$V(P(F_q|Q)) = T \quad ; \quad V(F_q) = \bot$

here ② & ③ Parsing tree current Equivalent

Since $(F_q = \bot)$ is change by $p(F_q|Q) = T$

so $P(F_q|Q) \not\models P(P((F_q|Q)|Q))$

2) $P \not\models P(P(F_q|Q)|Q)$

$V(Q)$ comb T or $\bot$

Case 1 $V(Q) = F$

$P(Q|Q) = T$

$\Rightarrow P(F_q|Q) = T$

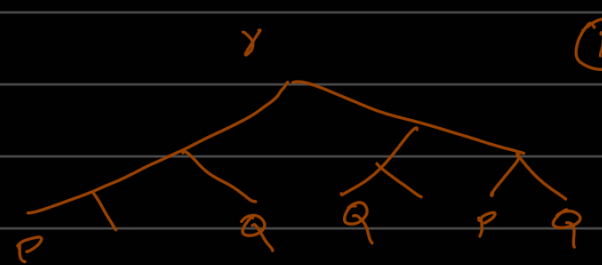
Since $V(F_q) = \bot$ and $V(Q) = \bot$ there 1 & 2 are equivalent.

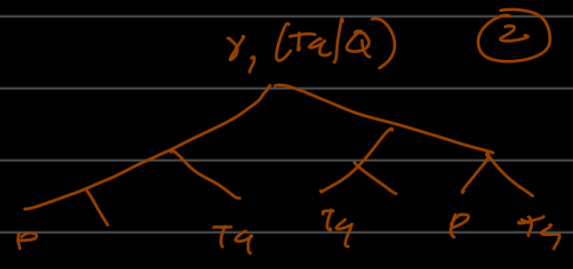
then P and $P(P(F_q)|Q)$ arent equivalent since $V(Q) = F$ & $P(F_q|Q) = T$

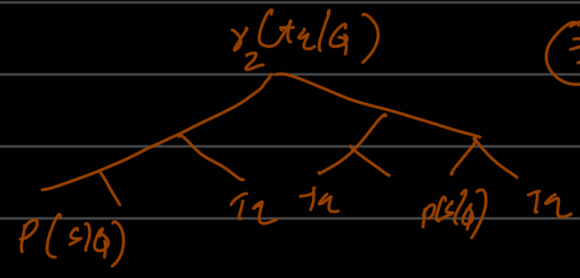
So valuation can be different.

$P \not\models P(P(F_q|Q)|Q)$ does not hold!

(2) $P \vdash \gamma(T_q/Q)$; $P(S/Q) \vdash \gamma(T_q/Q)$







Take the passing tree ② & ③

Claim ② & ③ are equivalent

Proof: Passing tree ② is just structural same as ③. But P is changed by P(S/Q).

Assume $V(P) = T$

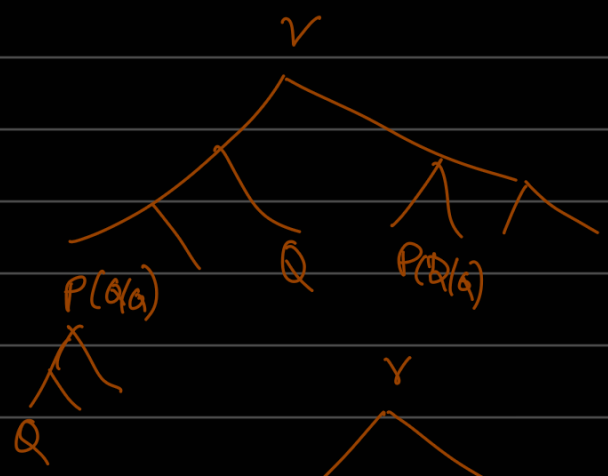
$\Rightarrow \gamma_1(T_q/Q) = T$

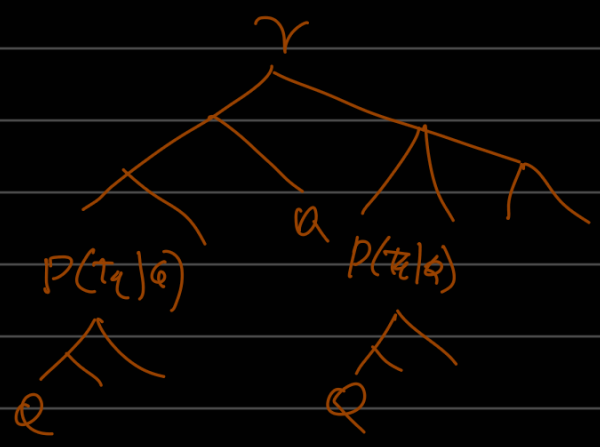
Since $V(P) = V(P(S/Q)) = T$ (Assump)

$\Rightarrow \gamma_2(T_q/Q) = T$

i.e $\left(P \vdash \gamma(T_q/Q)\right) \longrightarrow \left(P(S/Q) \vdash \gamma(T_q/Q)\right)$

2) $P(T_q/Q) \vdash \gamma$ $P(T_q/Q) \vdash \gamma(S/Q)$





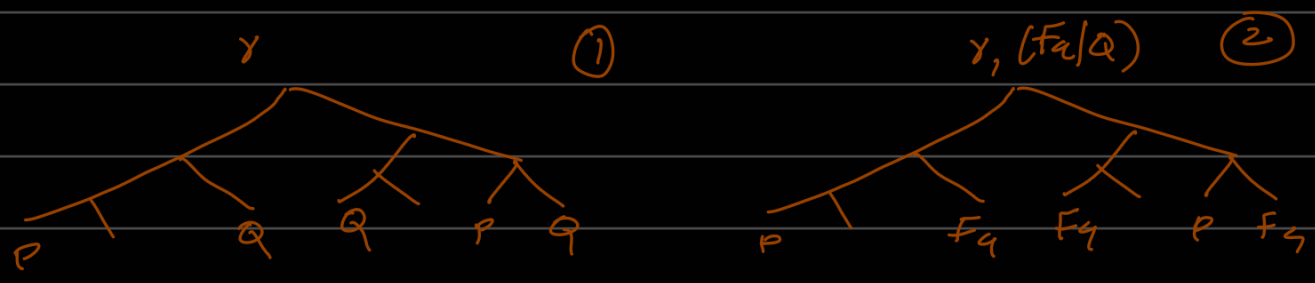
consider γ passing tree ② & ③. Proposition γ formed by 2 way of change Q Tq in Proposition P(only) but Q can be part of γ without being part of P.

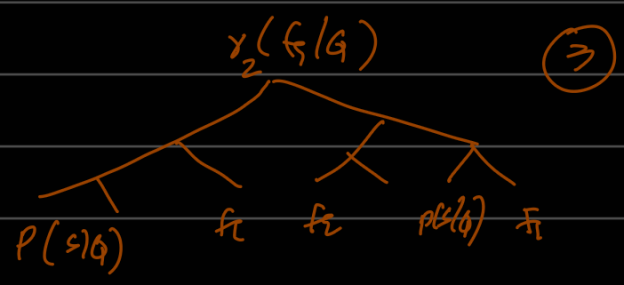
Let $V(S) = \perp$ and $Q = T$

then ② & ③ passing aren't equivalent.

⇒ If $P(T_q/Q) \vdash \gamma$ don't mean $\gamma(S/Q)$

(2) If T_2 is replaced by F_2





Consider passing tree ② & ③.

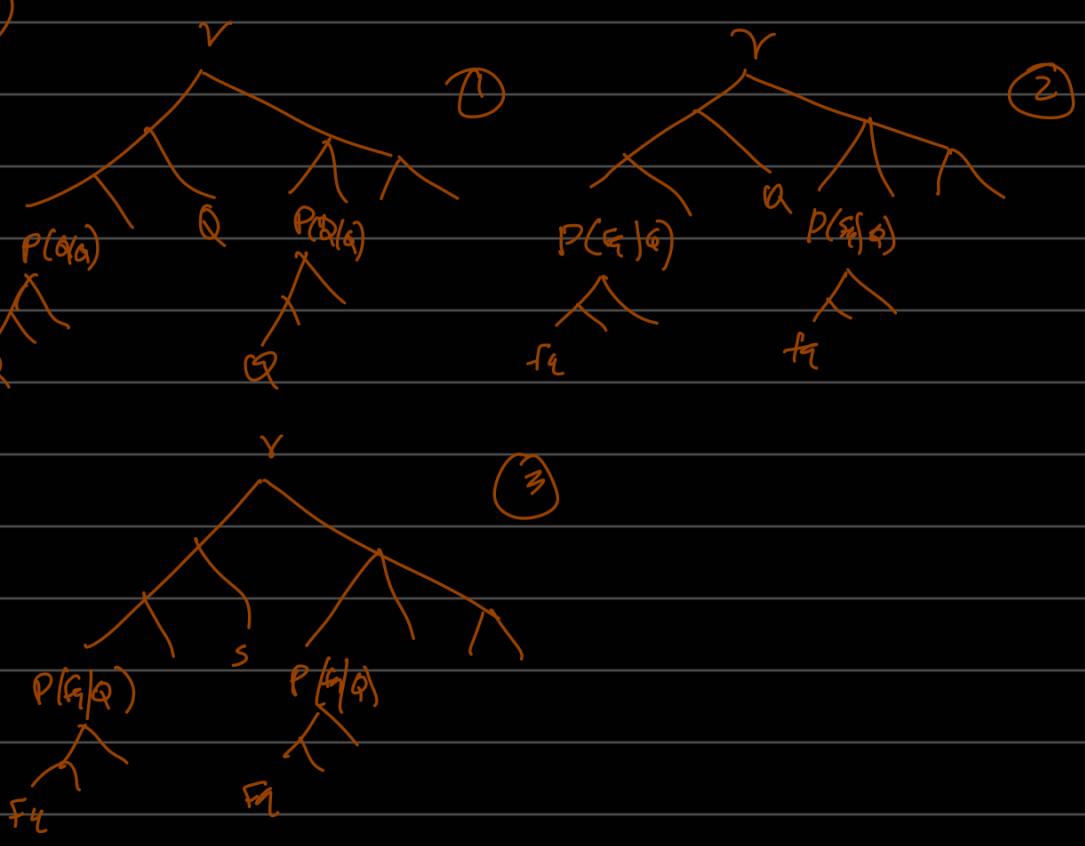
$V(P) = T$

$V(P(S/Q)) = T$

$\Rightarrow$ ② & ③ are equivalent, P is change to $P(S/Q)$ which both have same valuation

$\Rightarrow \left(P \models \gamma[F_2/Q]\right) \rightarrow \left(P(S/Q) \models \gamma(T_2/Q)\right)$

ii)



Consider V passing tree ② & ③. Proposition γ formed by 2 way as change Q T_2 in Proposition P(Only) but Q can be part of γ without being part of P.

Let $V(S) = \perp$ and $Q = T$

then ② & ③ passing aren't equivalent.

$\Rightarrow$ If $P(F_2/Q) \models \gamma$ don't mean $P(F_2/Q) \models \gamma(S/Q)$