

Practice Problems for Open Branch Interpretations

Construct Trees to determine the syntactic statuses or relations that hold for the following cases, and when appropriate, construct an OBI to demonstrate the corresponding *semantic* status or relation.

I. Theorem/Anti-Theorem/Neutral

- 1) $(F(a) \leftrightarrow F(b)) \rightarrow \exists x(F(x) \leftrightarrow \exists y(F(y) \wedge (x \neq y)))$
- 2) $(\neg(F(a) \rightarrow \exists x(H(x) \wedge G(x))) \wedge G(b))$

II. Establishment/Non-Establishment

- 1) $\{ \forall x \forall y (R(x,y) \rightarrow R(y,x)), R(b,a) \} \vdash (R(a,b) \rightarrow R(a,a))$
- 2) $\{ (F(a) \wedge F(b)), \forall x(F(x) \rightarrow G(x)), \exists y(G(y) \wedge H(y)) \} \vdash (G(a) \vee G(b))$

III. Compatible/Incompatible

- 1) $\{ \exists x H(a,x), \forall y (H(a,x) \rightarrow H(b,x)), (b = c) \}$
- 2) $\{ R(a,b), R(c,d), ((a=c) \rightarrow (b \neq d)), (a=c), (b=e), (d=e) \}$

IV. Coupled/Uncoupled

- 1) $((P(a) \rightarrow \forall x(P(x) \rightarrow Q(x))) \vee P(b)), (\neg P(b) \vee (P(a) \rightarrow \exists y(P(y) \wedge \neg Q(y))))$
- 2) $\forall x(F(x) \rightarrow (b = x)), \neg \exists y(F(y) \wedge (y \neq b))$