

We established nine rules to develop the semantic tree of any given sentence of *PropLog*:

1. Double negation:

$$(DN) \quad \begin{array}{c} \neg\neg A \\ A \end{array}$$

2. Conjunction:

$$(C) \quad \begin{array}{c} A \wedge B \\ A \\ B \end{array}$$

3. Negated conjunction:

$$(NC) \quad \begin{array}{c} \neg(A \wedge B) \\ \swarrow \quad \searrow \\ \neg A \quad \quad \neg B \end{array}$$

4. Disjunction:

$$(D) \quad \begin{array}{c} A \vee B \\ \swarrow \quad \searrow \\ A \quad \quad B \end{array}$$

5. Negated Disjunction:

$$(ND) \quad \begin{array}{c} \neg(A \vee B) \\ \neg A \\ \neg B \end{array}$$

6. Implication (Conditional):

$$(I) \quad \begin{array}{c} A \rightarrow B \\ \swarrow \quad \searrow \\ \neg A \quad \quad B \end{array}$$

7. Negated Implication (Conditional):

$$(NI) \quad \begin{array}{c} \neg(A \rightarrow B) \\ A \\ \neg B \end{array}$$

8. Biconditional:

$$(B) \quad \begin{array}{c} A \leftrightarrow B \\ \swarrow \quad \searrow \\ \begin{array}{c} A \\ B \end{array} \quad \quad \begin{array}{c} \neg A \\ \neg B \end{array} \end{array}$$

9. Negated Biconditional:

$$(NB) \quad \begin{array}{c} \neg(A \leftrightarrow B) \\ \swarrow \quad \searrow \\ \begin{array}{c} A \\ \neg B \end{array} \quad \quad \begin{array}{c} \neg A \\ B \end{array} \end{array}$$