Tableau Properties

2.4.4 Theorem (Propositional Tableau is Sound)

If for a formula ϕ the tableau calculus computes $\{(\neg\phi)\} \Rightarrow_{\mathsf{T}}^{*} N$ and N is closed, then ϕ is valid.

2.4.5 Theorem (Propositional Tableau Terminates)

Starting from a start state $\{(\phi)\}$ for some formula ϕ, the relation $\Rightarrow_{\mathsf{T}}^{+}$ is well-founded.

2.4.6 Theorem (Propositional Tableau is Complete)

If ϕ is valid, tableau computes a closed state out of $\{(\neg\phi)\}$.

2.4.7 Corollary (Propositional Tableau generates Models)

Let ϕ be a formula, $\{(\phi)\} \Rightarrow_{\mathsf{T}}^{*} N$ and $s \in N$ be a sequence that is not closed and neither α-expansion nor β-expansion are applicable to s. Then the literals in s form a (partial) valuation that is a model for ϕ.