Preview of Lecture 01.25

On 01.25, we will begin to explore the expressive power of truth-functional logic. At the end of the last lecture, we suggested using the notion of the proposition expressed by a schema as an intuitive vehicle for pursuing this investigation. Since the semantical correlate of a truth-functional schema is a set of truth assignments to some finite set of sentence letters, we can frame the question of the *expressive completeness of truth-functional logic* in terms of propositions. Let X be a finite set of sentence letters. We deploy the notation: $\mathbb{A}(X)$ for the set of truth assignments to the sentence letters X, and and $\mathbb{S}(X)$ for the set of truth-functional schemata compounded from sentence letters all of which are members of X. If $\mathfrak{P} \subseteq \mathbb{A}(X)$, we call $\mathfrak{P}$ a *proposition over* X. We will establish

Theorem 1 (Expressive Completeness of Truth-functional Logic) *Let X be a finite set of sentence letters and let $\mathfrak{P}$ be a proposition over X. There is a schema $S \in \mathbb{S}(X)$ such that $\mathbb{P}_X(S) = \mathfrak{P}$.*

With Theorem 1 in hand, we will be able to approach several interesting questions about truth-functional logic, some of which arise in connection with Problem Set 2.