Math A4400: Mathematical Logic
1st problem set, due at 2pm on wednesday, september 18th.
Bring your solutions class, or slide them under the door of my office NAC 6278.

1. Prove that for any sentence ϕ, the number of sentence symbols occurring in ϕ is one more than the number of binary connectives occurring in it, all counted with repetition. For example, there are four sentence symbols and three binary connectives in $\wedge p_0 \to\to p_1 p_0 p_1$.

2. (a) Is there a sentence α such that for any truth assignment V, $V(\alpha) = T$ if and only if $V(p_i) = T$ for $i = 0, 1, 2$?

   (b) Is there a sentence β such that for any truth assignment V, $V(\beta) = T$ if and only if $V(p_0)$, $V(p_1)$, and $V(p_2)$ are either all T or all F?

   (c) Is there a sentence γ with the following truth table?

p_0	p_1	p_2	γ
T	T	T	T
T	T	F	F
T	F	T	F
T	F	F	T
F	T	T	F
F	T	F	F
F	F	T	T
F	F	F	F

   (d) Is there a sentence that is satisfied by exactly one truth assignment?

3. Read Definition 1.3.2 and solve Exercise 1.3.15.

4. Ask an interesting question about this week's material and try to answer it. This question is as serious as the rest of them!