CS486 Applied Logic Assignment 2 Due Tuesday, Feb 13, 2001

Reading: Please read Smullyan, Chapter II:

p. 15-24 by Thursday, Feb 8
p. 25-30 by Tuesday Feb 13
p. 30-40 by Thurs Feb 15

Exercises:

1. Recall that $\mathbf{B}$ are the Booleans, {t,f} and Value was defined in Lecture 3 (see Lecture Notes). Prove this valuation theorem in detail by induction on Form.

   $\forall$X:Form. $\forall$ v_0:$Var_X \rightarrow \mathbf{B}$. $\exists$y: $\mathbf{B}$. Value(X,v_0,y).

2. Solve the Exercise on p. 24, items 2, 3, 6, and 7.

3. What is the maximum number of nodes that can appear in an analytic tableau (considered as a tree) for a formula of degree *n*? Explain your answer.

4. Prove that truth tables considered as a proof system are consistent and complete (see Smullyan for definitions, p. 25).

5. **Extra credit.** Write a recursive definition for the type of an analytic tableau (see p. 24).