Applied Logic	**Homework 1**
CS 486 Spring 2005	**Due Date: Thursday, February 10, 2005**

Note on integrity: You may discuss problems with fellow students, but all written work must be entirely your own, and should not be from any other course, present or past. If you use a solution from another source you must cite it, including from other people who help you.

Reading

Read pp.1–24 in Smullyan for next tuesday.

Questions

(1) Explain, in your own words, why we need a uniqueness decomposition lemma (p.6 in Smullyan).

Bonus: Prove the unique decomposition lemma.

(2) Prove that if v and v' are Boolean valuations that extend the same interpretation v_0, then v and v' agree on all formulas.

(3) Let v_0 be an interpretation, and define $v(\phi) = value(\phi, v_0)$. Prove that v is a Boolean valuation that extends v_0.

(4) Do Exercise 5 in Smullyan (p.14) for the choice operator $|$. (Read Exercise 4 for a definition of "definable".)

Bonus: Do the same for $\downarrow$, the joint denial operator.