CS 395T, Spring 2005
Answer Set Programming

Splitting

For any formulas F, G and any atom A, F^A_G stands for the formula obtained from F by substituting G for all occurrences of A.

Theorem 1 Let F be a formula and A an atom. If A is not a head atom of F then F has the same answer sets as $F^A_\bot$.

Theorem 2 Let F be a formula and A an atom. A set X of atoms is an answer set of $F \wedge A$ iff there exists an answer set Y of $F^A_\top$ such that $X = Y \cup \{A\}$.

Theorem 3 (Splitting Set Theorem) Let F and G be formulas such that G doesn't contain any head atoms of F. A set X of atoms is an answer set of $F \wedge G$ iff there exists an answer set Y of G such that X is an answer set of $F \wedge \bigwedge_{A \in Y} A$.

Exercise Use the theorems above to find the answer sets of the following programs from the handout on answer sets:

(i) programs Π_n from Problem 1.5;

(ii) the program from Problem 1.7;

(iii) programs (8) and (11);

(iv) the programs from Problems 3.2(a) and 3.2(b).