CS 302, Theory of Computation
Even Semester, 2004-2005
Home Assignment # 1
Due Date: 25/01/2005

18/01/2005

1. Add the 0-ary connectives 0 (*true*) and 1 (*false*) to the language of propositional logic, with $v(1) = T$ and $v(0) = F$ for any truth assignment v. For any formula A and atom P, let A_1^P be the formula obtained from A by replacing P by 1. Similarly for A_0^P. Let $A_\star^P = (A_1^P \vee A_0^P)$. Prove the following results:

   (a) $A \models A_\star^P$, i.e., $A_\star^P$ is a logical consequence of A. (4 points)

   (b) If $A \models B$ and P does not appear in B, then $A_\star^P \models B$. (6 points)

   (c) (*Semantic Version of Craig Interpolation Lemma*) If $A \models B$, then there is some C (an "interpolant") all of whose atoms occur both in A and B such that both $A \models C$ and $C \models B$. (10 points)