CS206 Tutorial No. #3

Date: Feb 10, 2006

1. Consider following CNF formula.

$$\begin{aligned}(\neg A_1 \vee A_2 \vee A_3) \quad &\wedge \quad (\neg A_1 \vee A_3 \vee A_9) \\ &\wedge \quad (\neg A_2 \vee \neg A_3 \vee A_4) \\ &\wedge \quad (\neg A_4 \vee A_5) \\ &\wedge \quad (\neg A_4 \vee A_6 \vee \neg A_8) \\ &\wedge \quad (\neg A_5 \vee \neg A_6) \\ &\wedge \quad (A_7 \vee A_1 \vee \neg A_{10}) \\ &\wedge \quad (A_1 \vee A_8) \\ &\wedge \quad (\neg A_7 \vee \neg A_8)\end{aligned}$$

   (a) Check if this CNF formula is satisfiable using DPLL method.

   (b) Assume $A_9 = \bot$ and $A_{10} = \top$. Now, check if we can find a solution for above formula using DPLL. What is your observation about 'Pure Literals' in DPLL from this exercise?

2. A directed graph on n vertices is given such that every vertex has *atleast* one incoming edge. Assume an adjacency matrix representation of the graph A. Two vertices are given *special* names, namely the *start* vertex and the *target* vertex. The goal is to determine if the *target* vertex is *reachable* from the *start* vertex using a SAT based formulation.