CSC 2401F 2002
HINT for Assignment 3

Q3

To show $L \in \Delta_2$, use a SAT oracle to compute the largest satisfying truth assignment of the given formula.

To show L is Δ_2-hard:
Say $L_1 = \mathcal{L}(M_1^{\mathcal{L}(M_2)})$ where M_1 is a (determinisitic) polynomial time oracle machine and M_2 is a nondeterministic polynomial time machine. We want to give a polynomial space reduction from L_1 to L. The idea is as follows:
Given a string α, we will construct a propositional formula F_α such that F_α is satisfiable, and such that the truth assignments satisfying F_α will represent the (not necessarily accepting) "semi-correct computations" of $M_1^{\mathcal{L}(M_2)}$ on α; "semi-correct" here means that each oracle question u receiving a YES answer in the computation is accomanied by an accepting computation of M_2 on u; we do not stipulate that the NO answers have to be correct.

We now order the variables of F_α in a special way ...