COS 594: Advanced Algorithms and Complexity **Spring 1999**

Assignment #3

Due: Monday, March 29 *Sanjeev Arora*

Suggested reading (for lectures on PCP Theorem): My Barbados lecture notes and references therein.

Problems

1. Show that if a function on n variables can be expressed both as a k-DNF and as a k-CNF then its decision tree complexity is at most k^2.

2. Classify the computational complexity of the following problem as well as you can: Given a decision tree, determine whether or not it has an equivalent decision tree of size m.

3. Show that the following problem is not in AC^0: Given a directed graph G (represented by its adjacency matrix) and vertex-pair (s, t), determine if there is a directed path from s to t in the graph.