Complexity Theory

Homework Set No. 4

Date Due: Dec 2nd 2004

Please turn in the homework on time. Preferably - printed.

1. Show that for general Branching Programs the equivalence problem is Co-NP Complete.

2. Show that if a function f has an fpras then there is an algorithm that in addition to x and ϵ gets δ and returns a correct approximation with probability at least $1-\delta$ in time polynomial in $|x|$, $1/\epsilon$ and $\log 1/\delta$

3. Suppose that a low memory device is given a stream of $a_1, a_2 \dots a_n$ and then $b_1, b_2, \dots b_n$ where $a_i, b_i \in \{0,1\}^\ell$ and has to determine whether the two multisets are equal. (I.e. whether there is a a permutation of the a' s that gives the b's.)

   1. Prove that no deterministic algorithm can succeed in the task.

   2. suggest a probabilistic algorithm and express the performance in terms of n, ℓ and the error ϵ.