Cmpt-405/705

Assignment 5

Problem 1

Define a TM that gets as input $a \sharp b$ with $a, b \in \Sigma^*$ and outputs $a + b$.

Problem 2

How would you define a TM with 3 tapes? Can a 3-tape TM do more in polynomial time than a TM with one tape?

Problem 3

Show that any language in NP can be decided by an algorithm running in time $2^{O(n^k)}$ for some constant k.

Problem 4

Professor Adam has two children, who, unfortunately, dislike each other. The problem is so serve that not only do they refuse to walk to school together, but in fact each one refuses to walk on any block that the other child has stepped on that day. The children have no problems with their paths crossing at a corner. Fortunately both the professor's house and the school are on corners, but beyond that he is not sure if it is going to be possible to send both children to the same school. The professor ha a map of his town. Show how to formulate the problem of determining if both his children can go to the same school as a maximum flow problem.