Assignment 11

Post Date: 24 Jan 2014  Due Date: 31 Jan 2014, 08:00 (AM)
You are permitted and encouraged to work in groups of two.

Problem 1: Cyclic Rotation 4 Points
Show how to determine in linear time whether a pattern $s$ is a cyclic rotation of a pattern $s'$. (For example “arc” and “car” are cyclic rotations of each other.)

Problem 2: Simultaneous Search 6 Points
Construct a deterministic finite automaton that reads any text once and is in an accepting state whenever it just finishes reading the occurrence of one of the patterns

$$01011, 00101, \text{ or } 10$$

over the alphabet $\Sigma = \{0, 1\}$. Your automaton may have more than one accepting state.

Problem 3: Knuth-Morris-Pratt 5 Points
Compute the boundary function for the pattern

$$P = ababbababbababbabb.$$ 

Problem 4: Transition Function 5 Points
Let $\delta$ be the transition function of a pattern $P[1, \ldots, m]$.

Give an $O(m|\Sigma|)$-time algorithm for computing the transition function $\delta$ corresponding to a given pattern $P$ of length $m$. 