IITM-CS2200 : Languages, Machines and Computation Date : Mar 1, 2012

Tutorial #4

Attempt the last question only in the end.

1. (2 points) Construct a DFA corresponding the following regular expression.

$$(0(01)^*(1+00)+1(10)^*(0+11))^*$$

2. (2 points) Construct a regular expression corresponding to the following NFA.

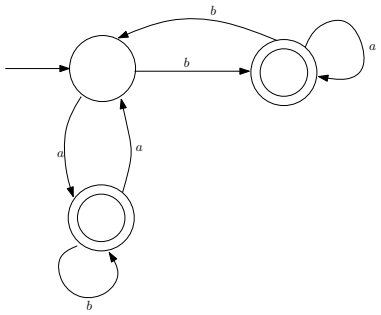

Figure 1: DFA for question 2

3. (2 points) Let A be a regular language. Show that the following language is also regular.

$$B = \{x : x^r x x^r \in A\}$$

4. (3 points) (a) Argue that if an NFA having k states accept any string at all, then it accepts a string of length at least $k-1$ or less.

   (b) Can non-deterministic 2-way finite automaton accept the language $\{a^n b^n : n \geq 0\}$. Why? or Why not?

5. (1 point) Let A be a regular language. Show that the following language is also regular.

$$B = \{x \mid x^{|x|} \in A\}$$

Use 2-way finite automata, and use your answer to the part(b) of the previous question.