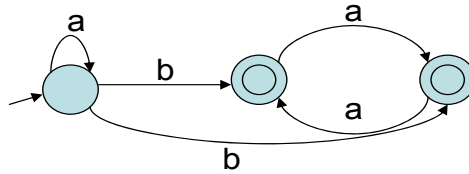


Homework 3
CS 321
Due Date: 10/23/09, 2 PM

Note: The homeworks should be your own work. You can discuss the homeworks orally with your peers, however. You should not use any web sources for this assignment. All questions carry equal weight. Please see the TA and the instructor during the office hours to get more help.

1. Give a regular expression for the following languages.
 - (a) $L_2 = \{a^n b^m : n < 4, m \leq 3\}$.
 - (b) The complement of L_2 .
 - (c) All strings over $\{a, b, c\}$ that contain no runs of a 's of length greater than two.
2. Find a DFA that accepts the language: $L(ab(a + ab)^*(a + aa))$.
3. Find a regular expression for the language accepted by the following NFA.



4. Find a regular expression that generates the following language on $\{a, b\}$. $L = \{w : (n_a(w) \text{ and } n_b(w) \text{ are both even})\}$.
5. Construct a right linear grammar for the language $L((aab^*ab)^*)$.
6. Construct a left linear grammar for the above language. (Hint: construct a right linear language for the reverse of the above language and reverse the right hand sides of all the rules.)
7. Give a regular grammar for the language $L = \{w : |n_a(w) - n_b(w)| \text{ is odd}\}$.