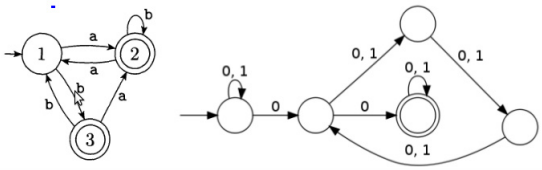
CS21004, Tutorial 3

1. Design NFAs for the following regular expressions over $\Sigma(a\,b)$

   a. $(aa^* + aba^*b^*)^*$

   b. $(ab(a + ab)^*(a + aa))$

2. Consider the following NFAs and write the equivalent regular expressions



(a) (b)

3. Consider a language L= $w\epsilon\Sigma^*|$ w contains at least two 0s, or exactly two 1s. Draw a NFA with six states that accepts this language.

4. Consider the regular expression $R = (aa)^* + b^*$.

   a. Draw an NFA of the above regular expression with not more than 4 states.

   b. Draw the equivalent DFA.

   c. Find $R^|$ which recognizes the complement of language recognized by R.

5. Find an NFA that accepts $((a + b)a^*) \bigcap (baa^*)$.

6. Let $\Sigma = \{1, \#\}$ and let $Y = \{w|w = x_1\#x_2\#x_3\#...\#x_k$ for $k > 0$, $x_i\epsilon 1^*$ and $x_i \neq x_j$ for $i \neq j\}$
   Prove that Y is not regular.

7. Prove or disprove the following languages as regular

   (a) $\{w|w\epsilon\{0, 1\}$ is not a palindrome $\}$.

   (b) $\{w|w$ contains an equal number of occurrences of the substrings 01 and 10 $\}$.