

## Assignment and Homework questions

### Assignment-1 ( to be written in Assignment book) Due Date: 04/09/2017

Build a deterministic FSM for each of the following languages. List a string belonging to the L and a string not belonging to L. Give the configurations for the strings listed

1.  $L = \{w \in \{a, b\}^* : \text{every } a \text{ in } w \text{ is immediately preceded and followed by } b\}$ .
2.  $L = \{w \in \{a, b\}^* : w \text{ does not end in } ba \}$ .
3.  $L = \{w \in \{a, b\}^* : w \text{ has } bbab \text{ as a substring}\}$ .
4.  $L = \{w \in \{a, b\}^* : w \text{ has neither } ab \text{ nor } bb \text{ as a substring}\}$ .
5.  $L = \{w \in \{0, 1\}^* : w \text{ is of even length and begins with } 01\}$ .
6.  $L = \{w \in \{0, 1\}^* : \text{strings such that number of 1's is even and the number of 0's is a multiple of } 3\}$

### Home work ( Write in Notes) Due date: 30/08/2017

Build a deterministic FSM for each of the following languages.

7.  $L = \{w \in \{0, 1\}^* : w \text{ corresponds to the binary encoding, without leading } 0\text{'s, of natural numbers that are evenly divisible by } 4\}$ .
8.  $L = \{w \in \{0, 1\}^* : w \text{ corresponds to the binary encoding, without leading } 0\text{'s, of natural numbers that are powers of } 4\}$ .
9.  $L = \{w \in \{0, 1\}^* : w \text{ has } 001 \text{ as a substring}\}$ .
10.  $L = \{w \in \{0, 1\}^* : w \text{ does not have } 001 \text{ as a substring}\}$ .
11.  $L = \{w \in \{a, b\}^* : w \text{ contains at least two } b\text{'s that are not immediately followed by } a\text{'s}\}$ .
12. The set of binary strings with at most one pair of consecutive 0's and at most one pair of consecutive 1's.
13.  $L = \{w \in \{a, b\}^* : |w| \equiv_5 0\}$
14.  $L = \{w \in \{a, b\}^* : \text{In } w, 4^{\text{th}} \text{ character from last is } a\}$
15.  $L = \{w \in \{a, b\}^* : w \text{ is not ending with } abb\}$ .
16.  $L = \{w \in \{a, b\}^* : \text{all strings with at least one 'a' and exactly two 'b's}\}$
17.  $L = \{w \in \{a-z\}^* : \text{all five vowels occur in } w \text{ in alphabetical order}\}$

### Problems already solved in the Class

18.  $L = \{w \in \{a, b\}^* : w \text{ has both } aa \text{ and } bb \text{ as a substrings}\}$ .
19.  $L = \{w \in \{a, b\}^* : |w| \bmod 3 = 0\}$
20.  $L = \{(01)^i 2^j \mid i \geq 1, j \geq 1\}$

