

**Birla Institute of Technology and Science, Pilani, Pilani Campus, Rajasthan**  
**CS F351 (Theory of Computation)**  
**Tutorial #2**

**Topic: Non-Deterministic Finite Automata (NFA)**

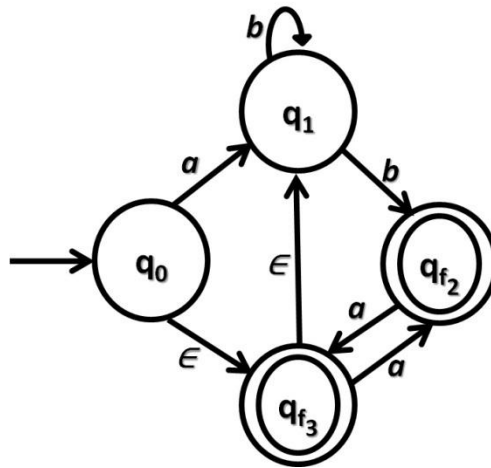
**Q1.** Design a Non-Deterministic Finite Automata over  $\Sigma = \{0,1,2\}$  for the following languages where

- a) Any number of 0's can be followed by any number of 1's and any number of 1's can be followed by any number of 2's.
- b) The length of the string is atmost 3. . ^
- c) The number of 0's and 1's are even.

**Q2.** Design the  $\epsilon$ -NFA for the following language 'L'

$$L = \{w \in \{0,1\} \mid \#_0(w) = 1 \text{ or } \#_1(w) \text{ is odd}\}$$

**Q3.** Convert the following  $\epsilon$ -NFA over  $\Sigma \in \{a, b\}$  into NFA.



**Q4.** Consider the following FA over  $\Sigma = \{a,b\}$ . Complement this automata and identify the language generated by this complemented DFA

