Tutorial-2

1. Let R = {(L 2). (2. 3), (2, 4)} be a relation in {l. 2, 3, 4}. Find R+

2. If A = {a, b} and B = {b, c}, find
   (a) (A ∪ B)*
   (b) (A ∩ B)*
   (c) A * ∪ B*
   (d) A * ∩ B*
   (e) (A - B)*
   (f) (B - A)*

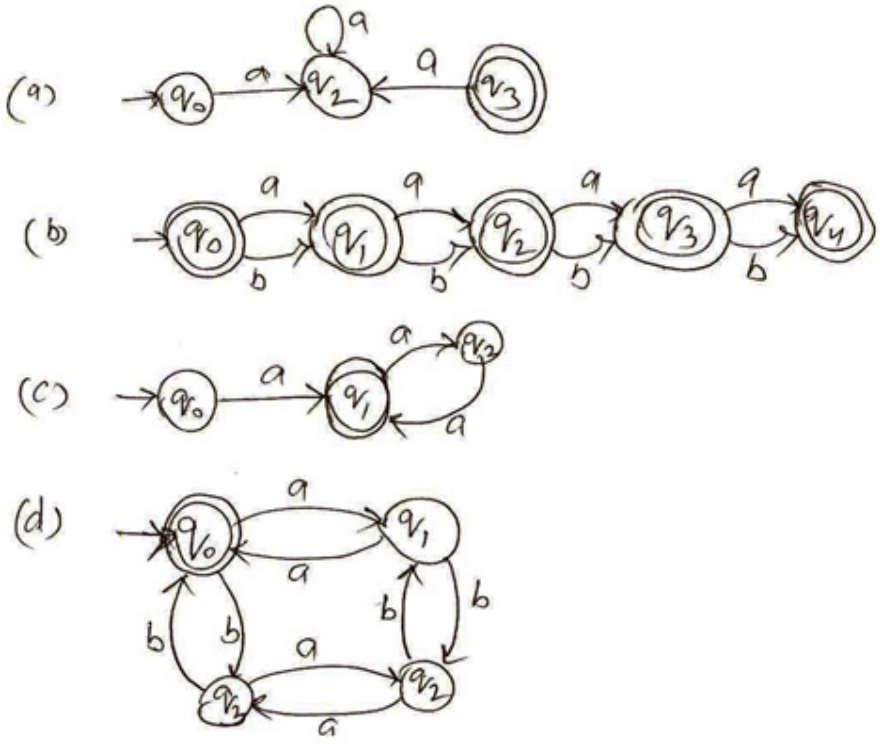
3. A finite automaton M has state set Q = {q0; q1; q2}. Its input alphabet is ∑ = {0; 1}, with q0 being the initial state and F = {q0}. The transition function δ is given by the following transition table.

δ	0	1
q0	q2	q1
q1	q1	q0
q2	q2	q2

   Give the state diagram for *M* and describe the language *L*(*M*).

4. Sheep go \baa!" or \baaa!" or \baaaa!" and so on. They do not go \baaa" or \ba!" or \!" or ". Construct a finite automaton (with input alphabet ∑ = {a; b ;!} that recognizes “sheep-talk".

5. Find the language of following FA:



6. Find the FA for following language:

(a) $L = \{a^{2n} \mid n \geq 0\}$

(b) $L = \{a^n b^m \mid n, m \geq 0\}$

(c) $L = \{a, b, aa, bb, aaa, bbb, \ldots\ldots\}$

(d) $L =$ { set of all strings over $\{0,1\}$ starting with 0 ending with 1 }