1.

Determine the DFA schematic for $M = (Q, \Sigma, \delta, q, F)$

where $Q = \{q_1, q_2, q_3\}$, $\Sigma = \{0,1\}$, q_1 is the start state, $F = \{q_2\}$ and δ is given by the table below.

Initial state q	Symbol σ	Final state $\delta(q,\sigma)$
q_1	0	q_1
q_1	1	q_2
q_2	0	q_3
q_2	1	q_2
q_3	0	q_2
q_3	1	q_2

Also determine a Language L recognized by the DFA.

2.

Obtain the DFA that accepts/recognizes the language

$L(M) = \{w \mid w \in \{a, b, c\}^*$ and w contains the pattern $abac\}$

3.

Design a DFA, the language recognized by the Automaton being

$$L = \{a^n b : n \geq 0\}$$

4.

Determine an NFA accepting the language

$L_2 = \{a^* \cup b^*\}$

5.

Given the NDA as shown in Fig. (a), with δ as shown in

Fig. (b).

Fig. (a)

	a	b
q_0	$\{q_0, q_1\}$	$\varnothing$
q_1	$\varnothing$	$\{q_1, q_2\}$
q_2	$\varnothing$	$\varnothing$

Fig. (b)

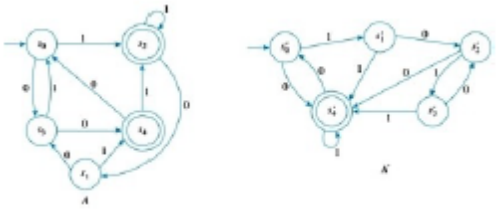
Determine the equivalent DFA for the above given NDA.

6.

Given $L_1 = \{a, ab, a^2\}$ and $L_2 = \{b^2, aba\}$ are the languages over $A = \{a, b\}$, determine {a} L_1L_2 (b) L_2L_2.

7.

Are the automata *A* and *A*' shown below equivalent?



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(a) design an automaton with the given input alphabet that accepts the given set of strings, and (b) find a regular expression that defines the language accepted by the automaton.

Input alphabet = {*a, b*}; Accepts the set of all strings of length at least 2 for which the final two input symbols are the same.