Consider the finite state machine whose transition function δ is given by Table 3.1 in the form of a transition table. Here, $Q = \{q_0, q_1, q_2, q_3\}$, $\Sigma = \{0, 1\}$, $F = \{q_0\}$. Give the entire sequence of states for the input string 110001.

TABLE 3.1 Transition Function Table for Example 3.5

State	Input	
	0	1
→ q_0	q_2	q_1
q_1	q_3	q_0
q_2	q_0	q_3
q_3	q_1	q_2

q_0 → Initial state

q_0 = accepting state

$q_0(110001)$

$q_1(10001)$

$q_0(0001)$

$q_2(001)$

$q_0(01)$

$q_2(1)$

q_3 ✗

110001

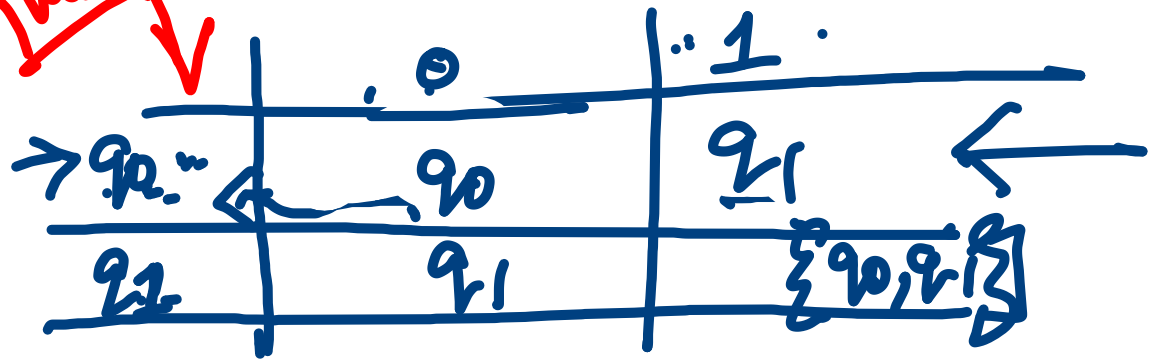
Construct a deterministic automaton equivalent to

$$M = (\{q_0, q_1\}, \{0, 1\}, \delta, q_0, \{q_0\})$$

where δ is defined by its state table (see Table 3.2).

TABLE 3.2 State Table for Example 3.6

State/Σ	0	1
→ q_0	q_0	q_1
q_1	q_1	q_0, q_1

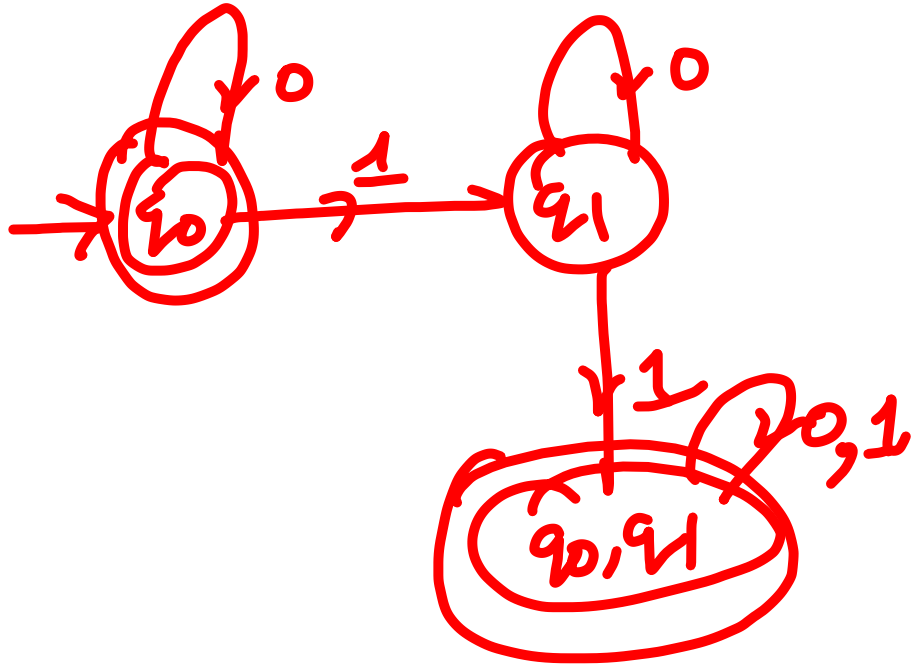


Tricks

1) Copy exactly same transitions from Initial state (row)

2) Construct DFA at Run Time depending states in the table

	0	1
→ q_0	q_0	q_1
q_1	q_1	$\{q_0, q_1\}$
$\{q_0, q_1\}$	$\{q_0, q_1\}$	$\{q_1, q_0\}$



Find a deterministic acceptor equivalent to

$$M = (\{q_0, q_1, q_2\}, \{a, b\}, \delta, q_0, \{q_2\})$$

where δ is as given by Table 3.4.

TABLE 3.4 State Table for Example 3.7

State/Σ	a	b
$\rightarrow q_0$	q_0, q_1	q_2
q_1	q_0	q_1
(q_2)	ϕ	q_0, q_1