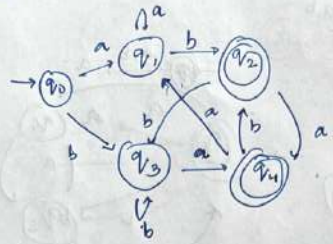
Tutorial - 1

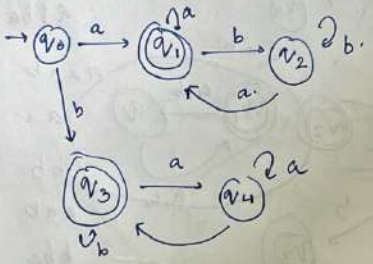
1. a)



abaa.
abab.
ababa.

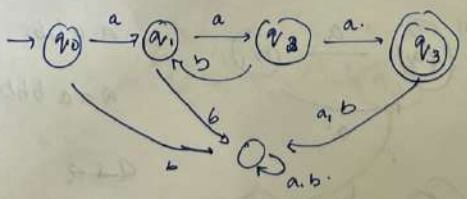
L = { set of all strings that end in 'ab' or 'aba' }

b)



L = { set of all strings that end in either 'a' or 'b' }

c)

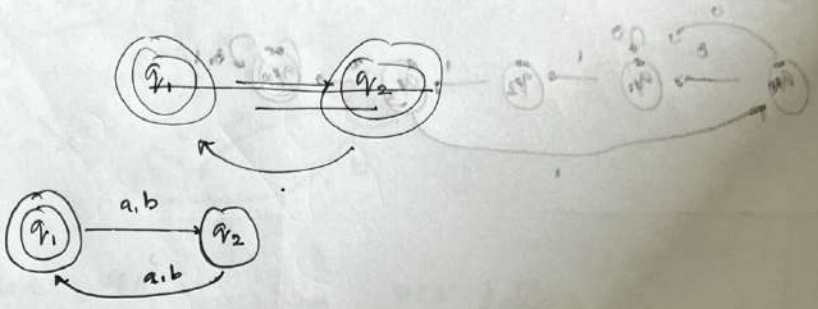


aabbaa
aabaa.
aaabbba.

~~L = { set of all strings that start and end with 'aa' with no consecutive bs in~~

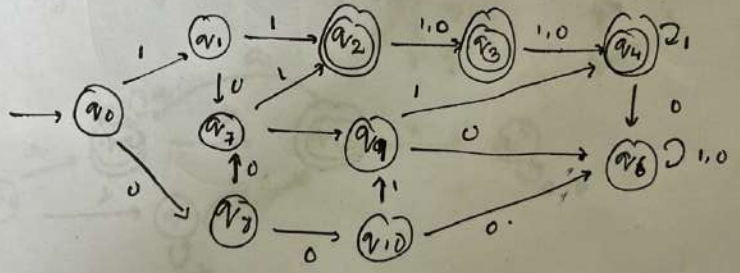
L = { set of a strings that contain substring "aa" with

2 a) L = {contains even no. of a's and b's} $\Sigma = \{a, b\}$



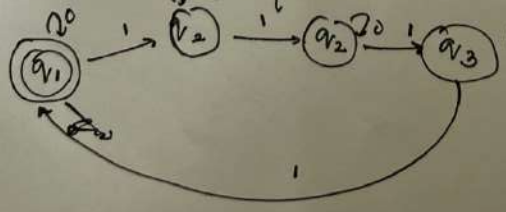
c) L_3 = {word is a binary string with atleast two ones and atmost 2 zeroes}

$\Sigma = \{0, 1\}$

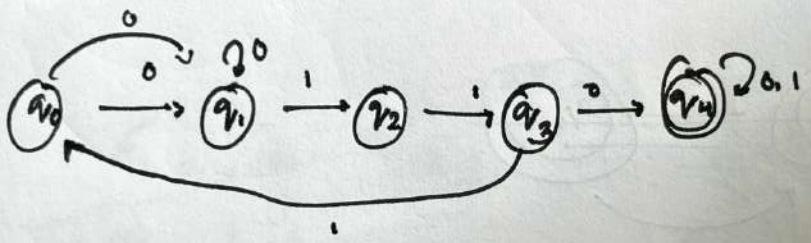


e) L_5 = {No. of consecutive 1's in word is 0 or a multiple of 4} $\Sigma = \{0, 1\}$

L_5 = {0, 00, 1111, 11 11 1111, 10111, 100111 ... }

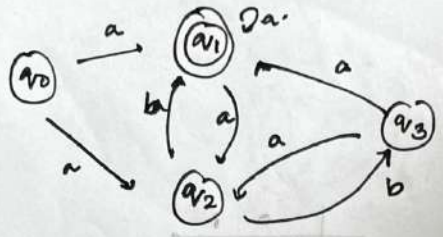


b) $L_2 = \{w | w$ contăi ne 0110, 1001, $\} \Sigma = \{0,1\}$



3. Convert NFA to DFA.

a)

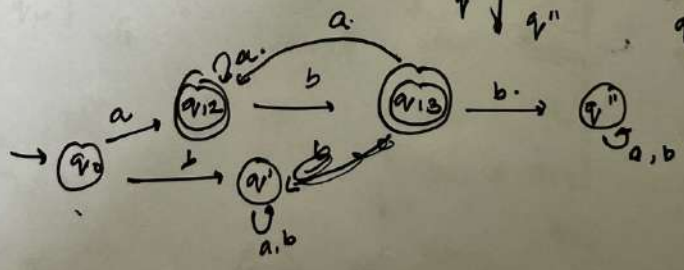


Transition table NFA

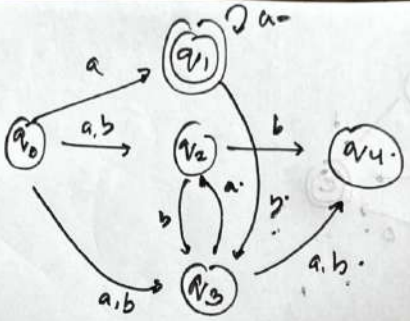
	a	b
→ q_0	$\{q_1, q_2\}$	ϕ
* q_1	$\{q_1, q_2\}$	ϕ
q_2	ϕ	$\{q_1, q_3\}$
q_3	$\{q_1, q_2\}$	ϕ

DFA table

	a	b
→ q_0	q_{12}	q'
* q_{12}	q_{12}	q_{13}
q'	q'	q'
* q_{13}	q_{12}	q''
q''	q''	q''



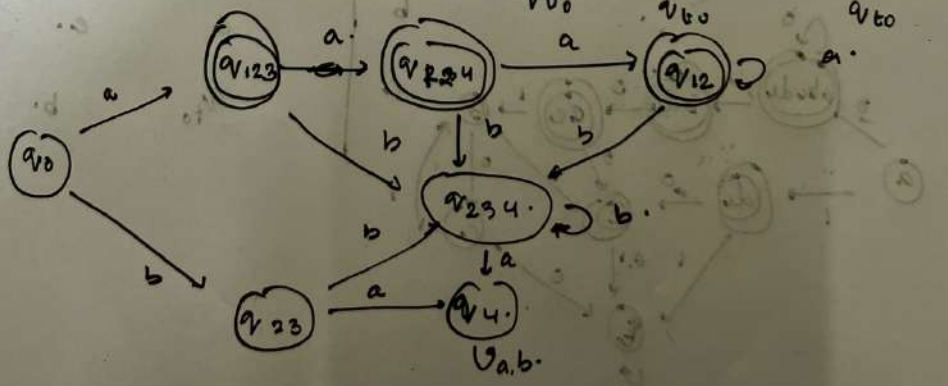
1)



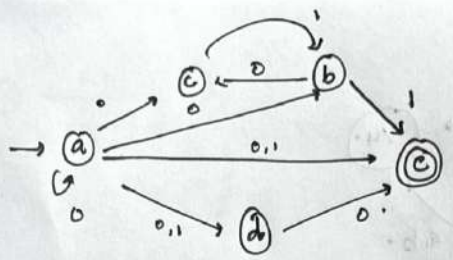
NFA

	a	b
→ q_0	$\{q_1, q_2, q_3\}$	$\{q_2, q_3\}$
* q_1	$\{q_1, q_2\}$	$\{q_2, q_3\}$
q_2	ϕ	$\{q_3 q_4\}$
q_3	q_4	$\{q_2 q_4\}$
q_4	q	ϕ

	a	b
→ q_0	$q_1 q_2 q_3$	$q_2 q_3$
* q_{123}	$q_1 q_2 q_4$	$q_2 q_3 q_4$
q_{23}	q_4	$q_2 q_3 q_4$
* q_{124}	q_{12}	q_{234}
q_{234}	q_4	q_{234}
q_4	q_{40}	q_{40}
* q_{12}	q_{12}	q_{234}
q_{40}	q_{40}	q_{40}



d)



NFA.

	0	1
→ a	{a,bc,d}	{d,e}
b	e	c.
c	ϕ	b.
d	e	ϕ
* e	ϕ	ϕ

DFA

	0	1
a	abcde.	de
abcde	abcde	bde.
bde.	ce	e.
de.	e	q_{bo}
~~acde~~	~~acde~~	~~de~~
q_{bo}	q_{bo}	q_{bo}
ce	q_{bo}	b.
b	c	e.
c	q_{bo}	b.