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LEADING UNIVERSITY

TUTORIAL OF THEORY OF COMPUTATION

Course Code : **CSE-3227**

Course Title : **Theory of Computation**

Date : ***28/05/2021***

Submitted by:

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Section : **7(C)**

Batch : **50th**

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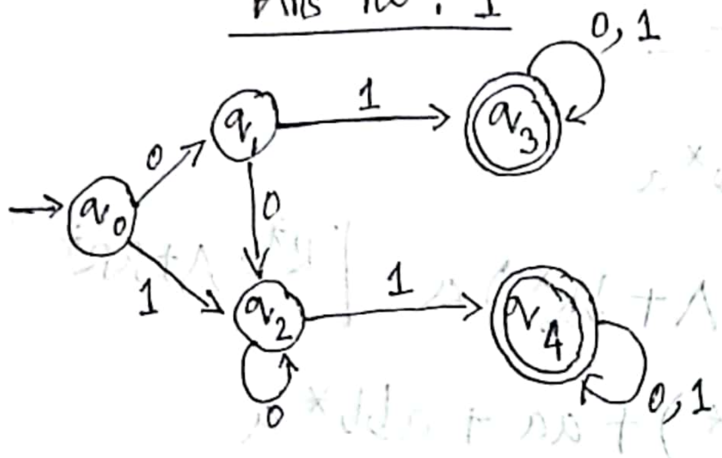
Lecturer

Computer Science & Engineering

Ans no: 1



Transition table

State \ Input	0	1
$\rightarrow q_0$	q_1	q_2
q_1	q_2	q_3
q_2	q_2	q_4
q_3	q_3	q_3
q_4	q_4	q_4

0-Equivalent:

$\{q_0, q_1, q_2\} \{q_3, q_4\}$

1-Equivalent:

$\{q_0\} \{q_1, q_2\} \{q_3, q_4\}$

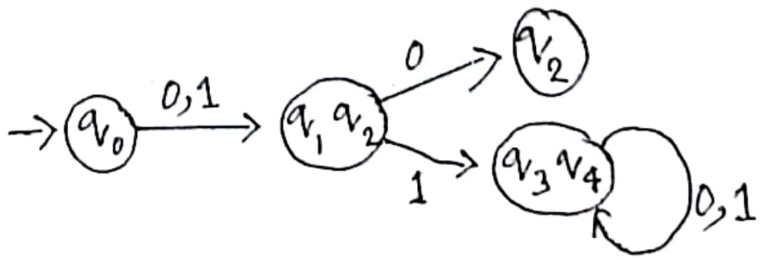
2-Equivalent:

$\{q_0\} \{q_1, q_2\} \{q_3, q_4\}$

Minimized Transition table:

State \ Input	0	1
$\rightarrow q_0$	$q_1 q_2$	$q_1 q_2$
$q_1 q_2$	q_2	$q_3 q_4$
$q_3 q_4$	$q_3 q_4$	$q_3 q_4$

Minimized DFA



Ans no: 2

$R.H.S = a^* + abb^* a$

$= a^* + a(\Lambda + bb^*)a \quad | R^* = \Lambda + RR^*$

$= (\Lambda + aa^*) + aa + abb^* a$

$= \Lambda + (aa^* + aa) + abb^* a \quad | R^* = \Lambda + RR^*$

$= \Lambda + a(a^* + a) + abb^* a$

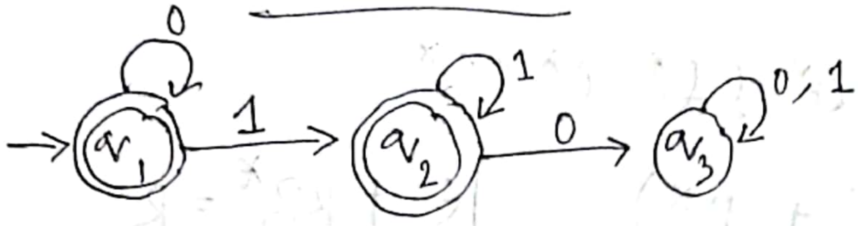
$= \Lambda + aa^* + abb^* a \quad | R^* = R + R^*$

$= a^* + abb^* a \quad | R^* = \Lambda + RR^*$

$= L.H.S$

$\therefore RHS = L.H.S$

Ans no: 3



$$q_1 = \epsilon + q_1 0 \longrightarrow (i)$$

$$q_2 = q_1 1 + q_2 1 \longrightarrow (ii)$$

$$q_3 = q_2 0 + q_3 0 + q_3 1 \longrightarrow (iii)$$

Final state (q_1)

$$(i) \rightarrow \underset{R}{q_1} = \underset{Q}{\epsilon} + \underset{R}{q_1}\,\underset{P}{0}$$

$R = Q + RP$

$R = QP^*$

$\epsilon h = h$

$$q_1 = \epsilon . 0^*$$

$$q_1 = 0^* \longrightarrow (4)$$

Final state (q_2)

$$(ii) \rightarrow \underset{R}{q_2} = \underset{Q}{q_1 1} + \underset{R}{q_2}\,\underset{P}{1}$$

$R = Q + RP$

$R = QP^*$

$$q_2 = 0^* 1 (1)^*$$

R = using both final state

$= 0^* + \cancel{0^* 1 1^*}\ 0^* 1 1^*$

$= 0^* (\epsilon + 11^*)$ | $\epsilon + RR^* = R^*$

$= 0^* 1^*$ (Regular expression)