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2K17/MCE/087

ASSIGNMENT-1

Theory of Computation

(1) A finite automato is a 5-tuple

$M = (Q, \Sigma, \delta, q_0, F)$ wher

→ Q is a finite set of states

→ q is an input alphabet

→ $\delta: Q \cap \Sigma \to Q$, the transition formation.

$q_0 \in Q$ is the initial state

$B \in Q$ is the final state set of final.

M accepted as string if M will be shady is states q_0 and Sending the characteristics of w, end up in the final state, so a fixed ~~stat~~ finite is a language sacrifice. A transportation system is a tuple (T to where T is a set of Configuration).

$T \in T$ is a set of terminal.

A finite automato can be seen as a labbled transistion system where configuration as it's state whose lable set id the input alphabet, whose terminal corrospondes to the transition function.

System that fails to be finite automata, the set of configurational may be infinite, as may the set of lables and transistion relations may cease to be

(2) DFA

1) It is a 5-tuple $(q, \Sigma, \delta, q_0, F)$, where δ is the transition function mapping from $a * \Sigma$ to q

2) It stands for deterministic finite automata which means on a single It can oney go to an single output/ have a single next state.

3) It cannot use Empty string transitions.

4) DFA can be visualised as one machine 5)

5) DFA is a complete system.

NDFA

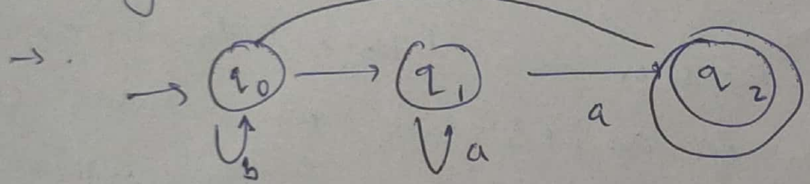
1) It is a 5-tuple $(q, \Sigma, \delta, q_0, F)$ where δ is the transition function mapping from $q * \Sigma$ into 2^q which is the power of q, the set of all subsets of q.

2) It stands for non-deterministic finite automata which means on any input it can go to multiple next states.

3) It can use empty string transition.

4) NDFA can be understood as multiple machine computing at same time

Q.3 DFA accepting language e{a, b} that have set of all string that end with ab.

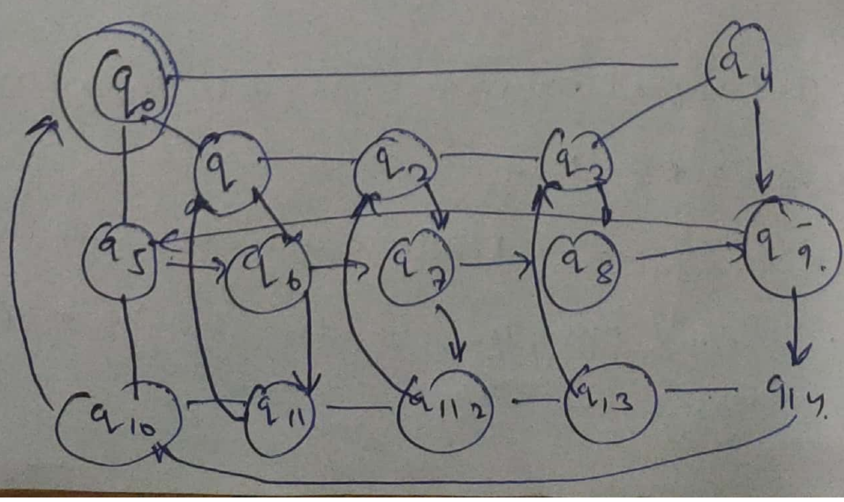


State	a	b
q_0	q_1	a_0
a_1	q_1	q_2
q_2	q_1	q_0

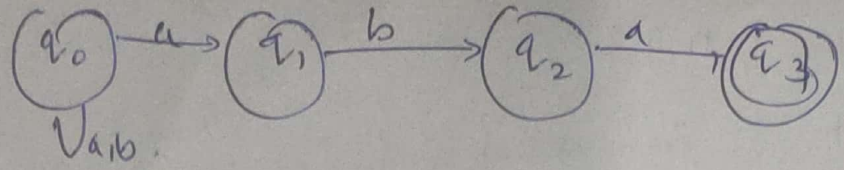
No of state = 3
Initial state = q_0
Final State = q_2

$L = \{ab, aab, bab, aaab, bbab, --\}$.

Q.4



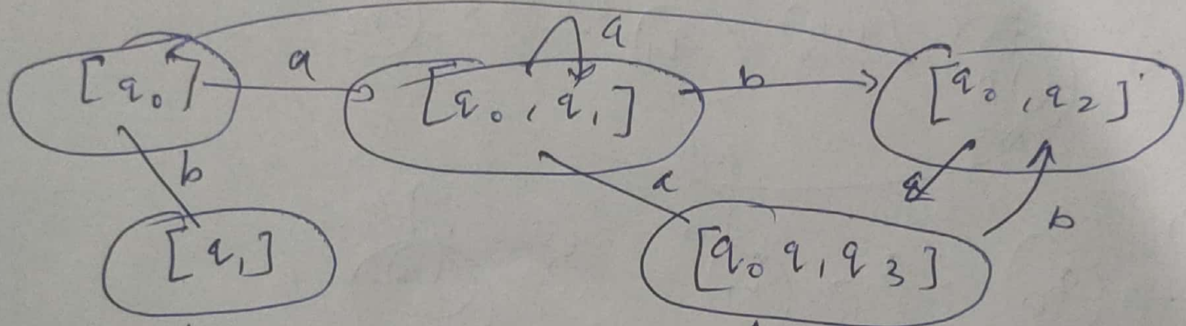
5)



state	a	b
q_0	$q_0 q_1$	q_0
q_1	–	q_2
q_2	q_3	–
q_3	–	–

converting this into DFA

state / ε	a	b
$\{q_0\}$	$[q_0 q_1]$	$[q_1]$
$\{q_0 q_1\}$	$[q_0 q_1]$	$[q_0 q_2]$
$\{q_0 q_2\}$	$[q_0 q_1 q_3]$	$[q_0]$
$\{q_0 q_1 q_2\}$	$[q_2, q_1]$	$[q_0, q_2]$



6)

Present state	a=0	a=1	output
→ q_0	q_1	q_2	1
q_1	q_3	q_2	0
q_2	q_2	q_1	1
q_3	q_0	q_3	1

Mealy

Present state	Next state a=0		a=1	
	state	output	state	output
q_0	q_1	0	q_2	1
q_1	q_3	1	q_2	1
q_2	q_2	1	q_1	0
q_3	q_0	1	q_3	1

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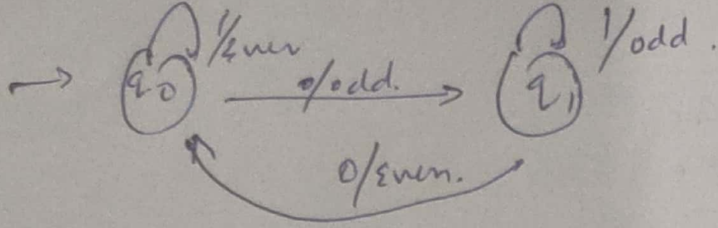
(1) Input alphabet = {0, 1}

(a) output alphabet = {Even, odd}

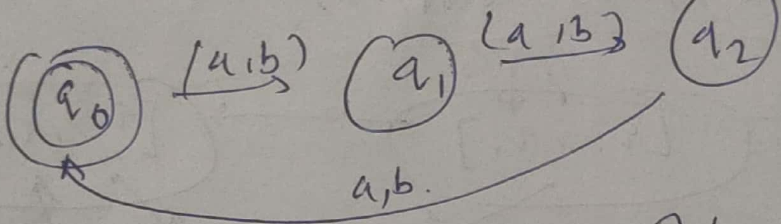


Transition table

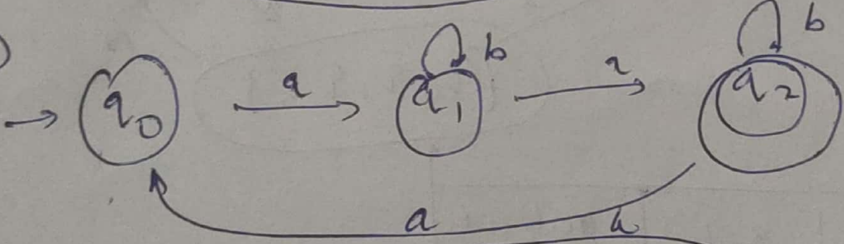
Present state.	Next state			
	a = 0		a = 1	
	state	output	state	output
q_0	q_1	odd	q_0	Even
q_1	q_0	Even	q_1	odd.

9)

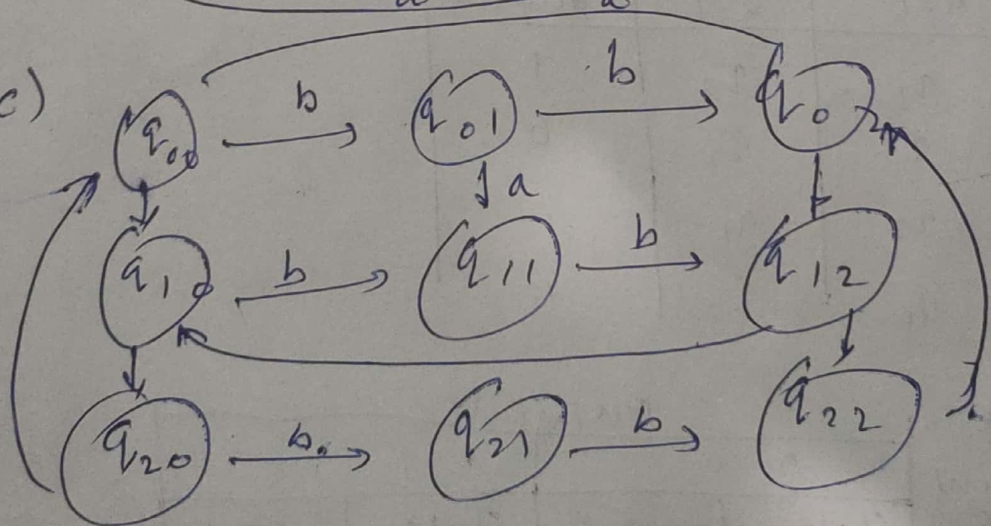
a)



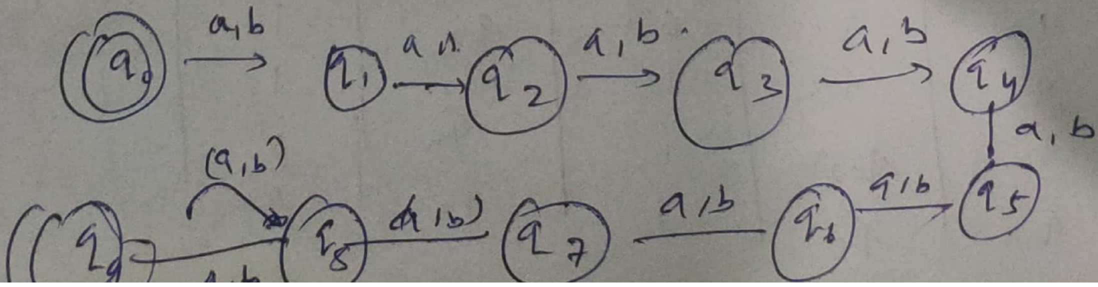
b)



c)



(A)



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