TECHNO INDIA UNIVERSITY

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Batch — BCS2B

Subject — Automata Theory

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(1.) Transition function for DFA, NFA and epsilon NFA.

→ For deterministic finite approach (DFA)

transition function: $Q \times \Sigma \longrightarrow Q$

where Q → finite set of state
Σ → set of input alphabet

for NFA,

transition function (δ): $Q \times (\Sigma \cup \varepsilon) \rightarrow 2^Q$

Q and Σ are same as before

ε → null move.

For epsilon NFA,

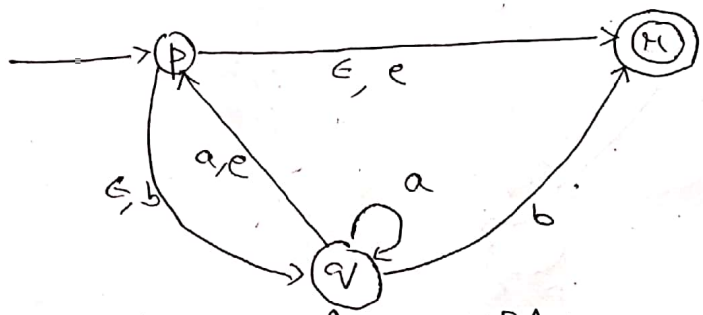
transition function (δ): $Q \times \Sigma_\varepsilon \longrightarrow P(Q)$

where Q, Σ and ε have representation as in case of NFA

and $\Sigma\varepsilon$ denotes $(\Sigma \cup \varepsilon)$

(2.) Convert epsilon NFA to NFA.

a)



Transition table for NFA :-

	a	b	c
p	{p,q,r}	{q,r}	{p,q,r}
q	{p,q,r}	n	{p,q,r}
r	ϕ	ϕ	ϕ

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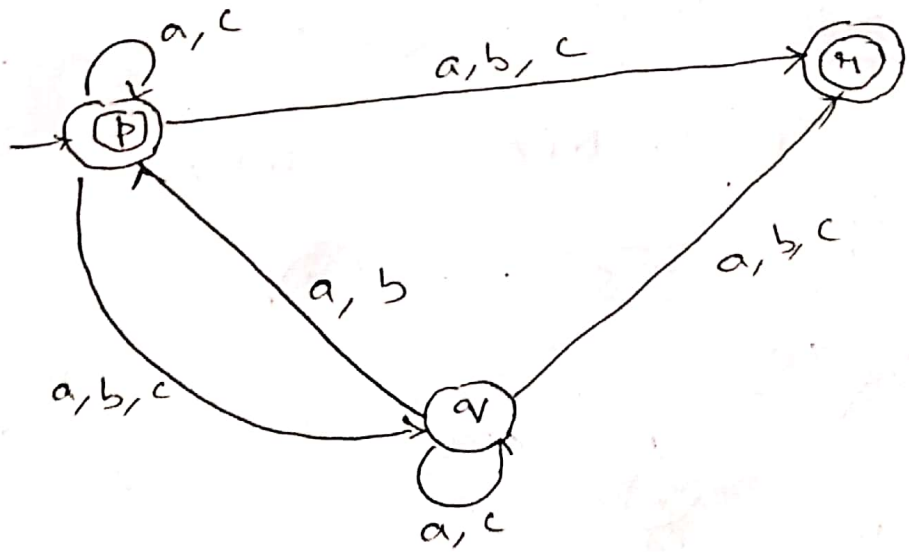
	ϵ^x	a	ϵ^x
p	p, q, r	ϕ, p, ϕ	p, q, r
q	q	p	p, q, r
r	r	ϕ	

	ϵ^x	b	ϵ^x
p	p, q, r	q, r, ϕ	q, r
q	q	r	r
r	r	ϕ	

	ϵ^x	c	ϵ^x
p	p, q, r	r, p, q, ϕ	r, p, q, r, q, ϕ
q	q	p-q	p, q, r, q
r	r	ϕ	

Finally NFA →



Final states: p, r

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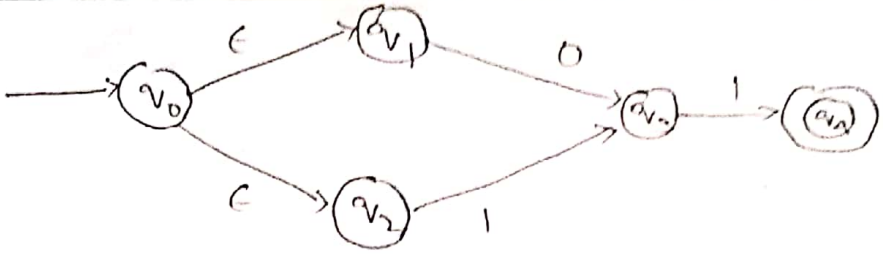
b)



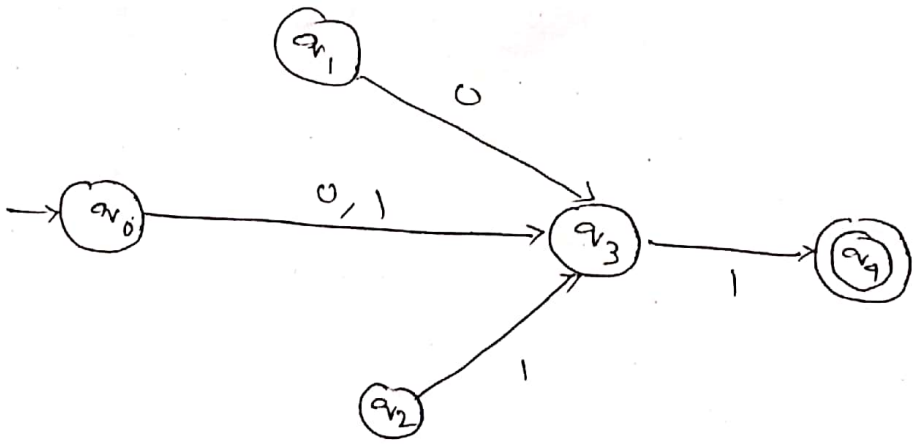
Transition state for NFA

	0	1
q_0	q_3	q_3
q_1	q_3	ϕ
q_2	ϕ	q_3
q_3	ϕ	q_4
q_4	ϕ	ϕ

	ϵ^*	0	ϵ^*
q_0	q_0, q_1, q_2	ϕ, q_3, ϕ	q_3
q_1	q_1	q_3	q_3
q_2	q_2	ϕ	
q_3	q_3	ϕ	
q_4	q_4	ϕ	

	ϵ^*	1	ϵ^*
q_0	q_0, q_1, q_2	ϕ, ϕ, q_3	q_3
q_1	q_1	ϕ	
q_2	q_2	q_3	q_3
q_3	q_3	q_4	q_4
q_4	q_4	ϕ	

Transition diagram →



final state : q_4

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