# CS & IT ENGINEERING

Theory of Computation

Finite Automata

DPP 08 Discussion Notes



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TOPICS TO BE COVERED

01 Question

02 Discussion



## Consider the following DFA over $\Sigma = \{0, 1\}$

Pw

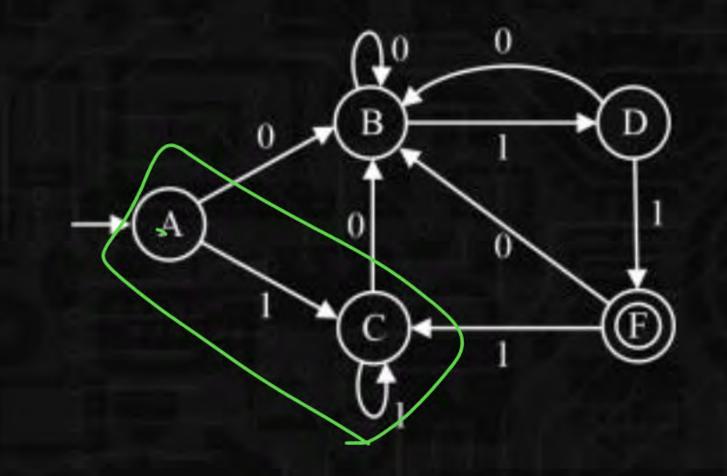
How many states are required in minimal DFA?

[MCQ]







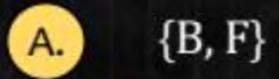


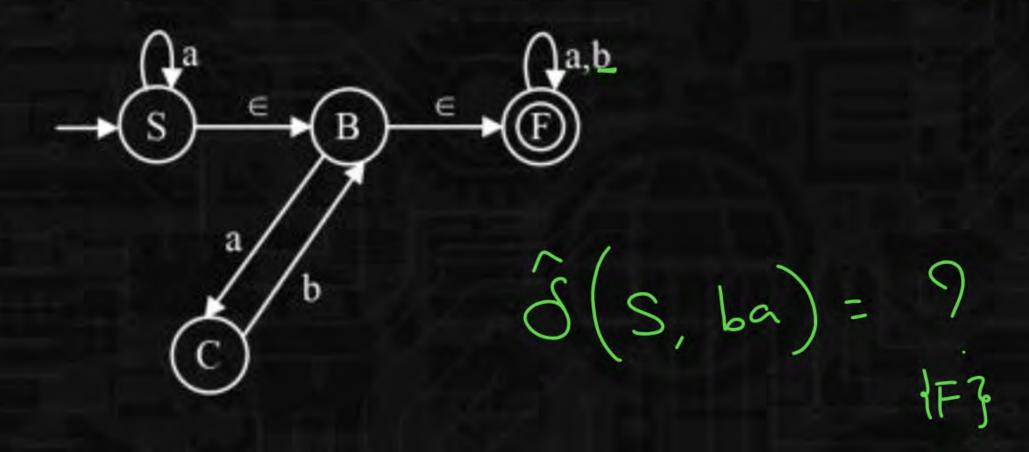


### Consider the following epsilon NFA:



What is the set of reachable states for the input string ba? [MCQ]



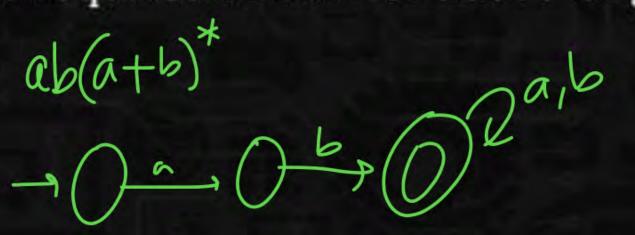


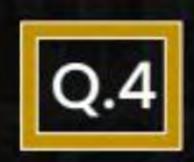


For language (L) =  $\{Xw \mid X = \{ab\}, w = \{a, b\}^*\}$ How many states are required in NFA for above language (L)?



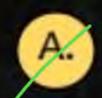
- A. 4
- B. 3
- G 6
- D. None



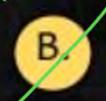


### Which of the following statement is/are correct?





Every DFA can be converted into equivalent NFA.



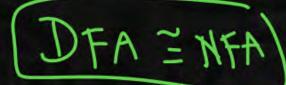
Every DFA can be convert into equivalent ∈-NFA. ~



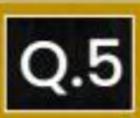
Every NFA can be converted into equivalent minimal DFA.



NFA with ∈-moves is not equivalent to NFA without epsilon move.

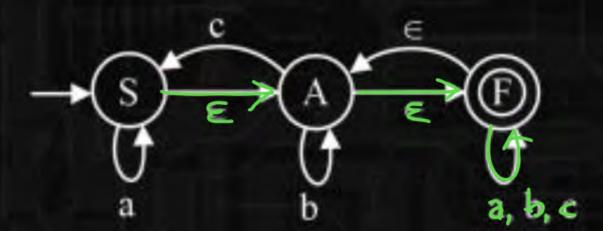


DFA = NFA wik E-movey = NFA without E-mover



#### Consider the following ∈-NFA:





Which of the following is/are correct regular expression for above ∈-NFA?

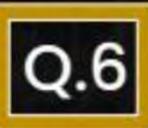




$$(a+b+c)^*$$



$$a^*b^*c^*(a+b+c)^*$$



Consider the following finite state automaton (M)



$$M: \bigoplus_{S} b \bigoplus_{A} a \bigoplus_{E} a,b \qquad \overline{n}: \qquad \longrightarrow_{S} b \bigoplus_{A} a \bigoplus_{B} a \bigoplus_{B}$$

Let  $\overline{M}$  be the modified automaton obtained from M by interchanging finals and non-finals. If language accepted by above automaton is L(M), then the language accepted by L( $\overline{M}$ ) will be:

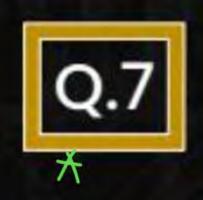
A. 
$$L(\overline{M}) = \{a(a+b)^*, (bb)(a+b)^*, \in \}$$

$$L(M) = \{ \epsilon, b \}$$

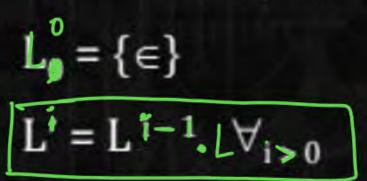
$$L(\overline{M}) = \{ \in, b \}$$

L(
$$\overline{M}$$
) = {not starting with 'ba'}

L(
$$\overline{M}$$
) = none of these



Given a language L, define L' as follows:



$$L_{0}^{0} = \{ \in \}$$

$$L_{0}^{1} = \{ \in \}$$

$$L_{0$$

The order of a language L is defined as the smallest k such that

$$L^k = L^{k+1}.$$

Consider the language  $L_1$  (over alphabet 0) accepted by the

following automaton.
$$L = \mathcal{E} + o(00)^{*}$$

$$O(L) - 2 / O$$

The order of  $L_1$  is \_\_\_\_\_.





