CS & IT ENGINEERING

Theory of Computation

DFA/NFA

DPP- 01

Discussion Notes

By- Venkat sir

[MCQ]

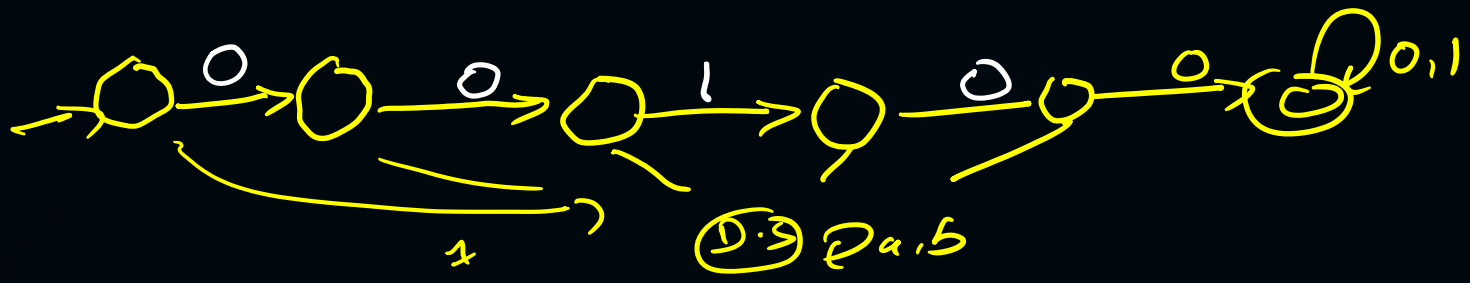
#Q. Design a deterministic finite automata of set of all binary strings over $\Sigma = \{0,1\}$, where every binary string starting with 00100. How many minimum numbers of states required for above FA?

A 6

B 5

C 7

D 4



[NAT]

#Q. How many states are required to design a minimal DFA for set of all binary strings over $\Sigma = \{0, 1\}$ where every binary string containing '0110' as a substring?

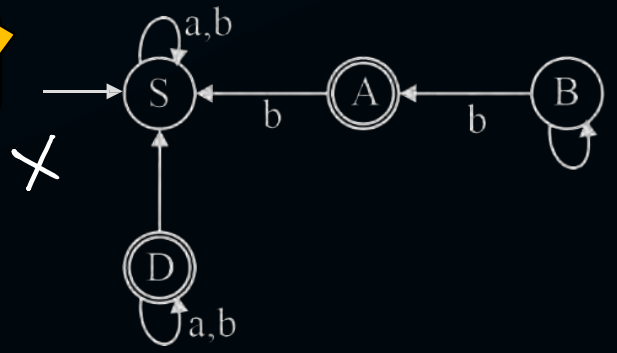
n length Substring → n+1

5 states.

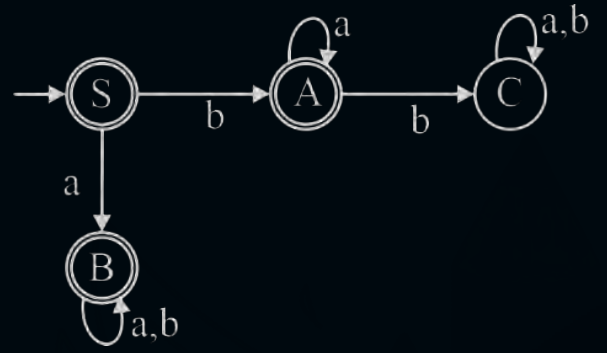
[MCQ]

#Q. Which of the following is correct design of a minimal DFA for set of all strings over Σ = {a, b} where every string does not start with bb?

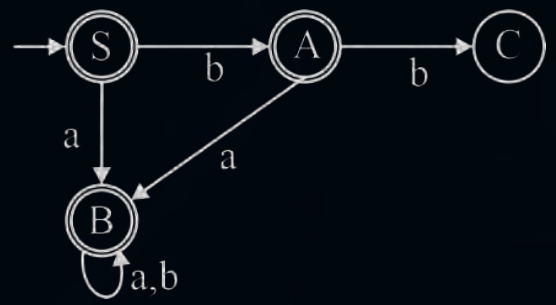
A



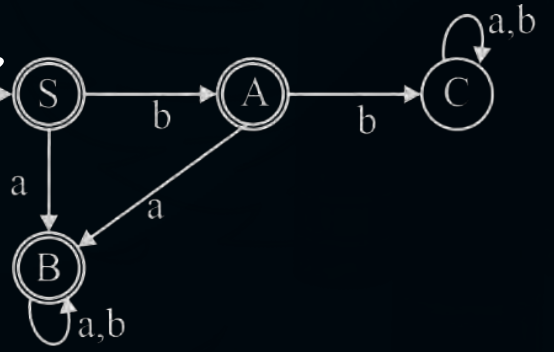
B

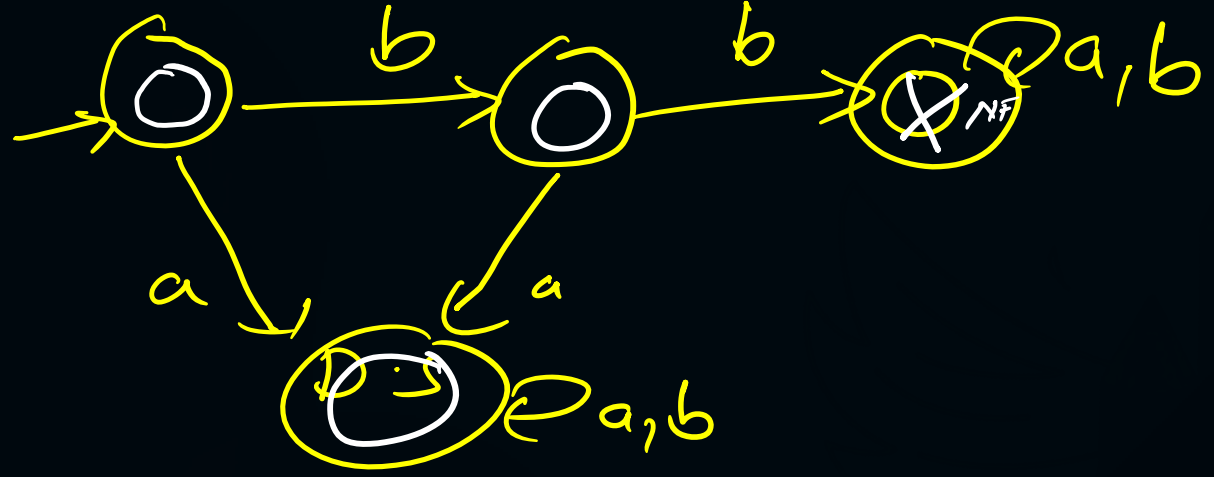


C



D




b
b
a,b
a
a
a,b

[MSQ]

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

(A, C)

A. DFA is possible for every regular language → TRUE

B. DFA is also possible for some non-regular languages. → $\{a^n b^n\}$ → false

C. DFA is possible for both finite language and regular infinite language. → true

D. There exist only 1 unique DFA for every regular language.

$(a+b)^*$ → false

[NAT]

#Q. How many states required to design a minimal DFA for $L = \{X\,ba \mid X \in \{a, b\}^*\}$? _____

$(a+b)^* ba \rightarrow (3)$

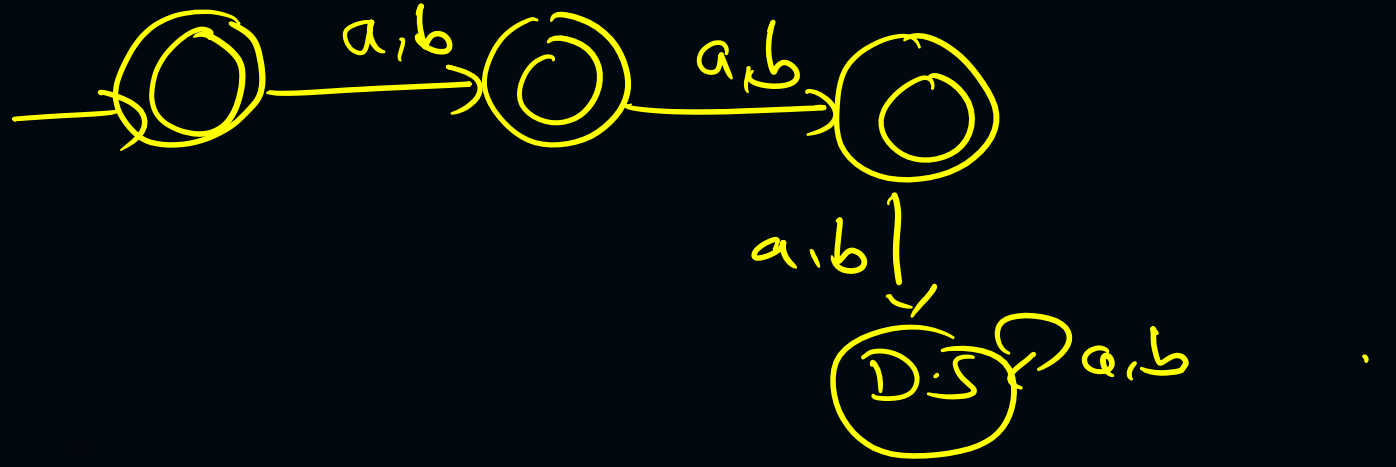
ending with n length $\rightarrow (n+1)$ states.

[NAT]

#Q. Number of final states required to design a minimal DFA for $L = \{(\in + b + a)^2 \mid \Sigma = \{a, b\}\}$ is / are ____.

3

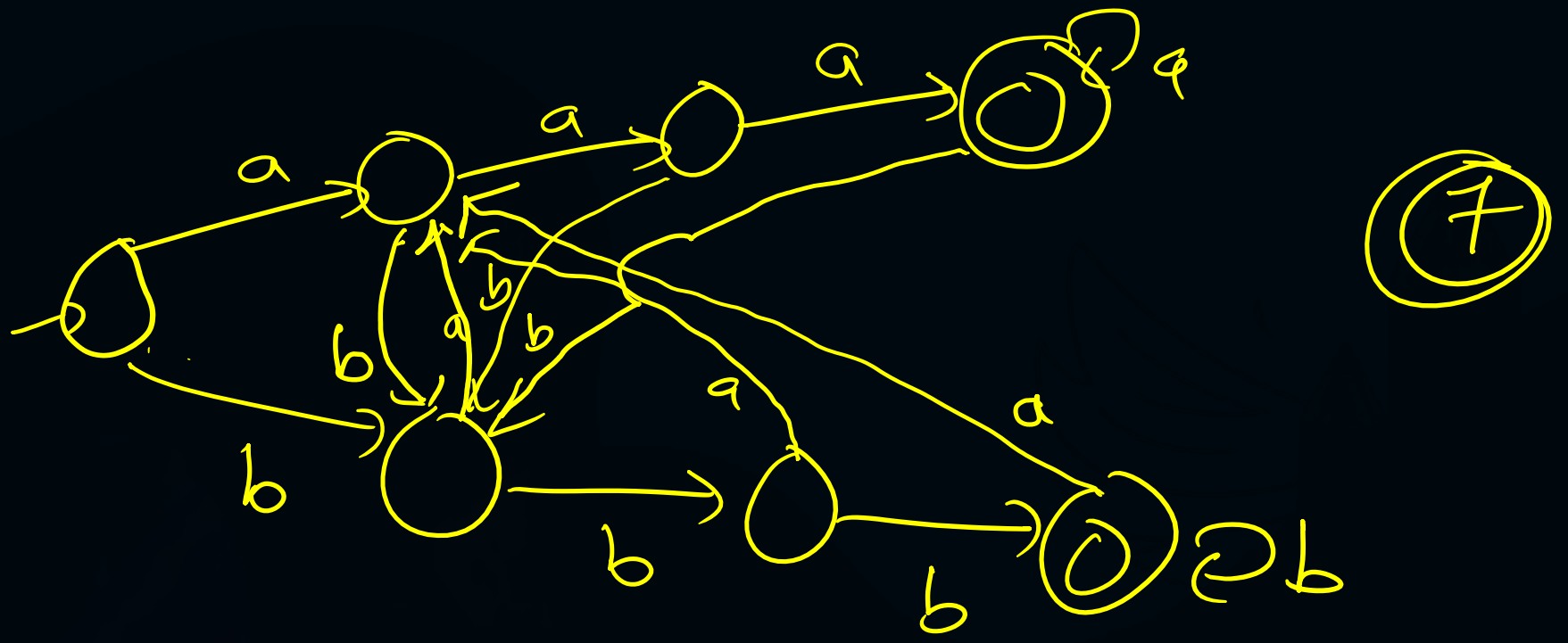
$(a + b + \epsilon)$ $(a + b + \epsilon) = \{\epsilon, a, b, aa, ab, ba, bb\}$



[NAT]

$\Sigma = \{a, b\}$

#Q. Let L be the set of all binary strings whose last three symbols are the same. The number of states in the minimum state DFA accepting L is ___.



[MCQ]

{2, 6, 10, 14, 18 - - -}

#Q. Consider a language L over Σ = {a}, L= {w | $n_a(w)$ multiple of 2 but not multiple of 4}.
How many states are required to design a minimum state DFA for above language L?

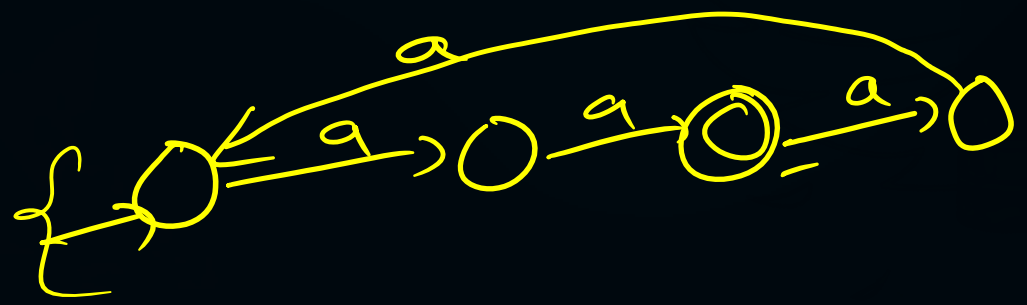
A 6

B 8

C 4

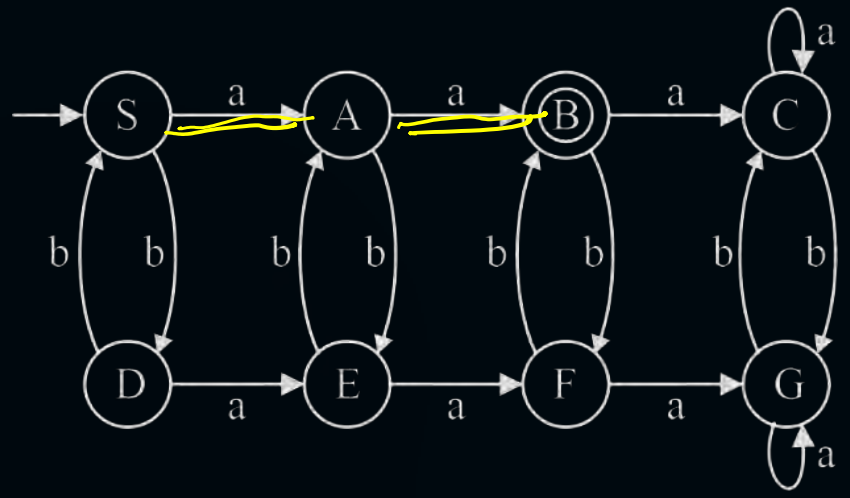
D 5

2 ✓
6 ✓
10 ✓
14 ✓



[MCQ]

#Q. The following finite state machine accept all those strings in which the number of a's and b's are respectively



A Divisible by 2 and even.

B Equal to 2 and odd.

C Equal to 3 and even.

D Equal to 2 and even.

[MCQ]

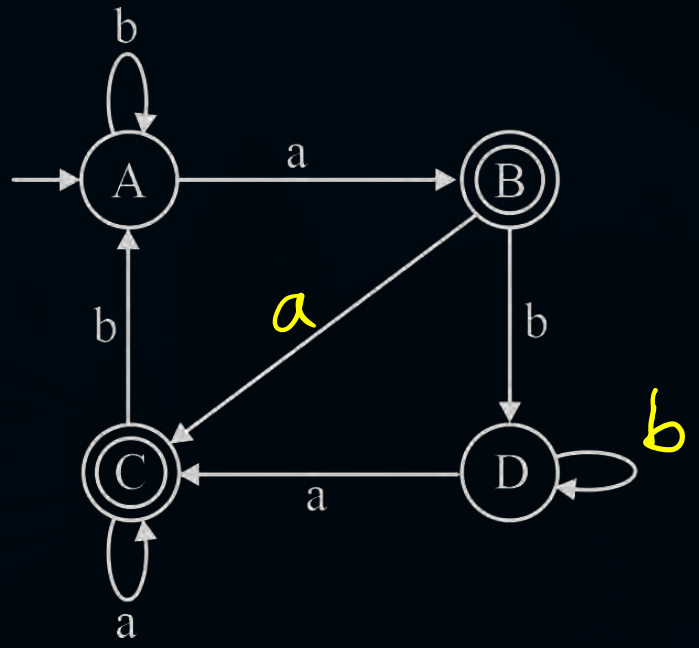
#Q. Identify the language accepted by the following deterministic finite automata over the input alphabet Σ = {a, b}.

A. All strings of a's and b's.

B. All strings which are ending with a.

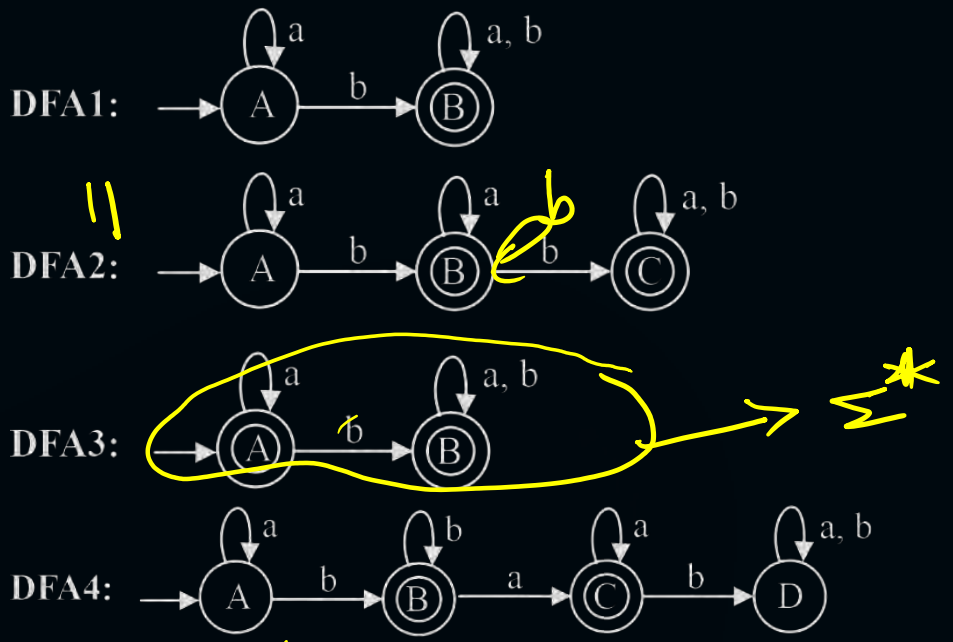
C. All strings which do not end with b.

D. All strings which contain 'a' as the substring.



[MCQ]

#Q. Consider the following DFA's.



Which of the following DFA's are equivalent?

A DFA1 and DFA2

B DFA2 and DFA3

C DFA3 and DFA4

D None of these

[MCQ]

#Q. Consider following two statements:

S_1: If every state is final state in DFA, then L(DFA) = Σ^* → Complete Language.

S_2: If every state is non-final state in DFA, then L(DFA) = {ε} → false
empty lang

A S_1 only.

B S_2 only.

C Both S_1 and S_2 are correct.

D Both are incorrect.

[MCQ]

#Q. For L = $\{(a + b)^2\}$, how many states are required in minimal DFA?

(a+b)(a+b) → 4.

A 2

B 3

C 4 ✓

D none.

THANK - YOU