CS & IT ENGINEERING

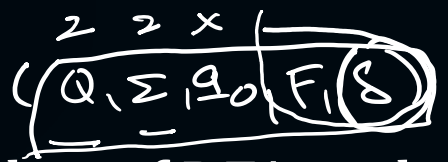
THEORY OF COMPUTATION

Regular Expressions

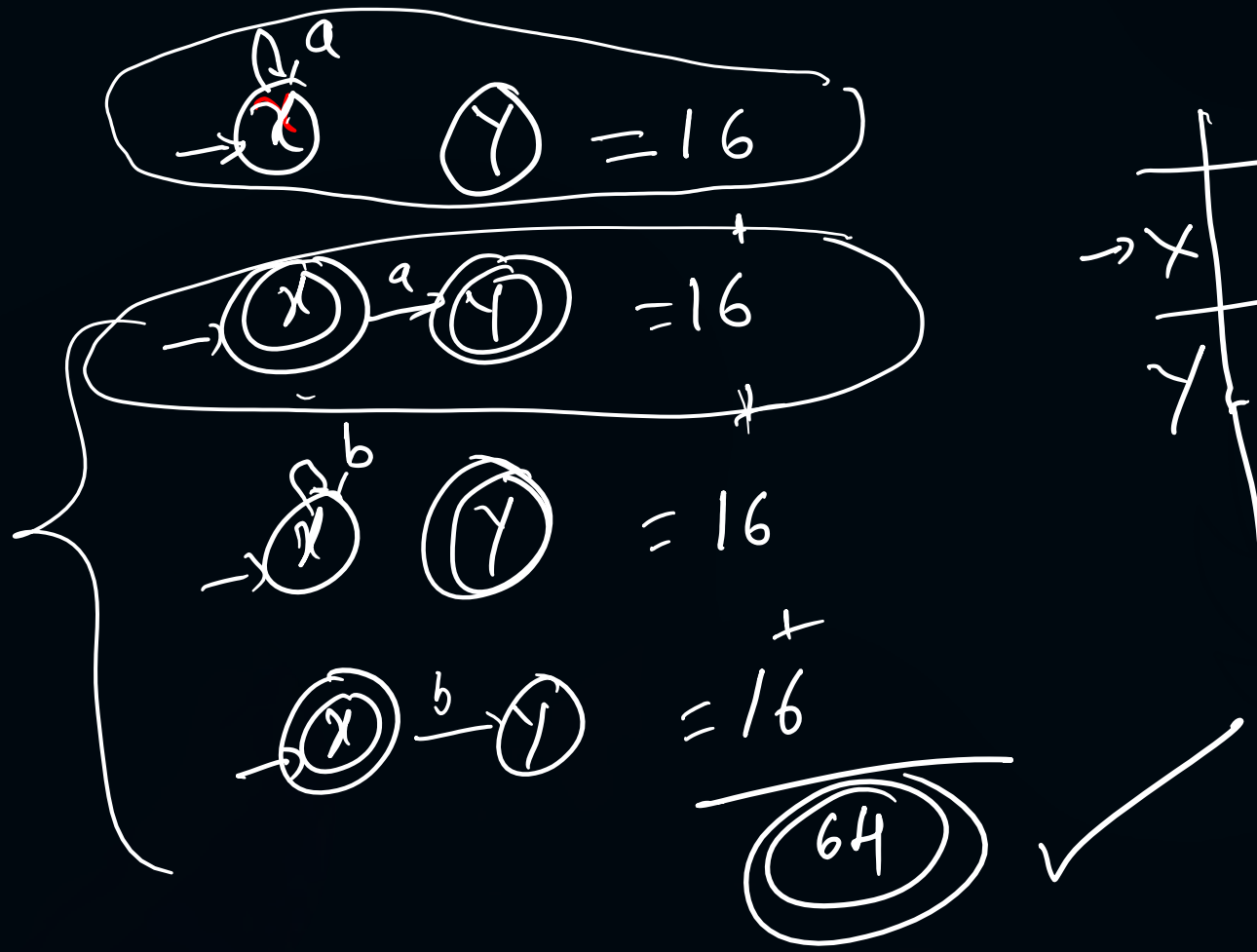
DPP – 02 Discussion Notes

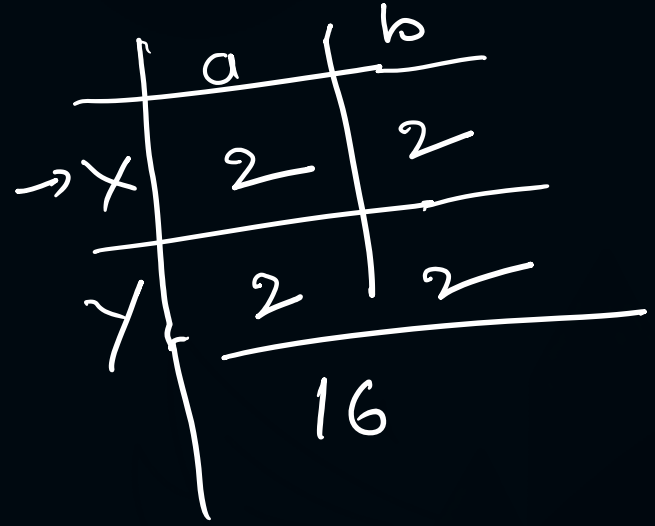
By- Venkat sir

[NAT]



#Q. The possible number of DFA with 2 states X,Y over the alphabet {a, b} where X is always initial state ?

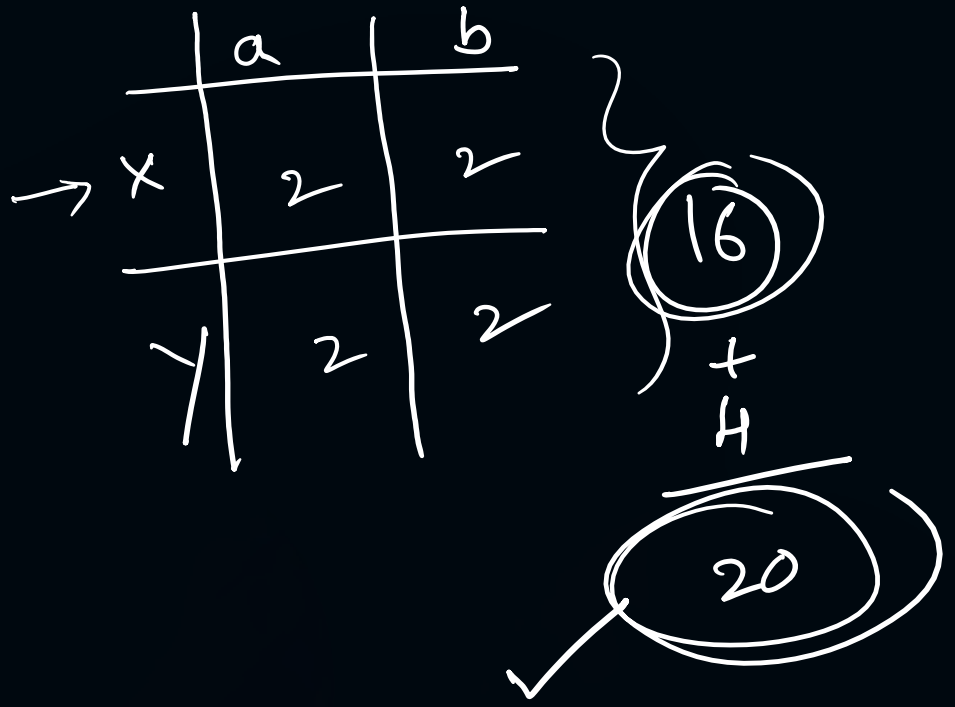


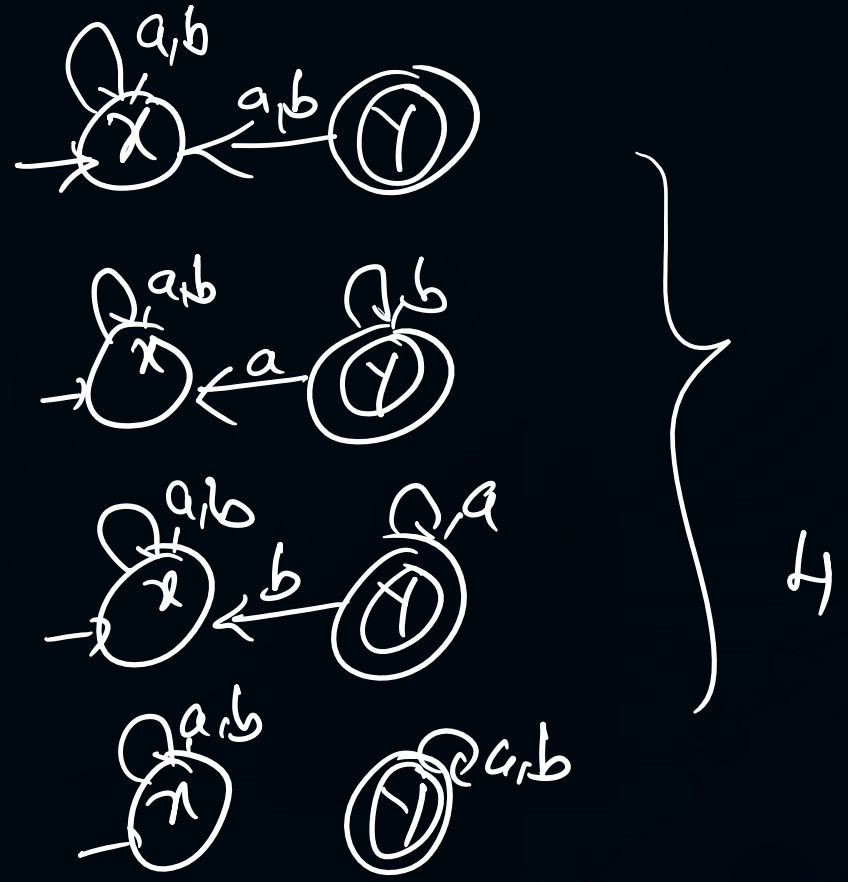


$2^4 = 16$

[NAT]

#Q. The possible number of DFA with 2 states X,Y over the alphabet {a, b} where X is always initial state , that accepts empty language?





[NAT]

#Q. The possible number of DFA with 2 states X,Y over the alphabet {a, b} where X is always initial state , that accepts complete language?

[MCQ]

Consider the DFA ,M with states Q={0,1,2,3,4}, input alphabet Σ = {0,1} start state 0, final state 0 and transition function $\delta(q,i) = |q^2 - i| \bmod 5$ $q \in Q$, input alphabets are {0,1}

#Q. The above DFA, M accepts all binary strings containing

A. even number of l's

B. odd number of 1’s

C. even number of 0's

D. odd number of 0’s

$\delta(q_1, i) = |q^2 - i| \pmod 5$

$\delta(0,0) = |0-0| \bmod 5 = 0$ ✓

$\delta(0,1) = |0-1| \bmod 5 = 1$ ✓

$\delta(1,0) = |1-0| \bmod 5 = 1$ ✓

$\delta(1,1) = |1-1| \bmod 5 = 0$ ✓

$\delta(2,0) = |4-0| \bmod 5 = 4$ ✓

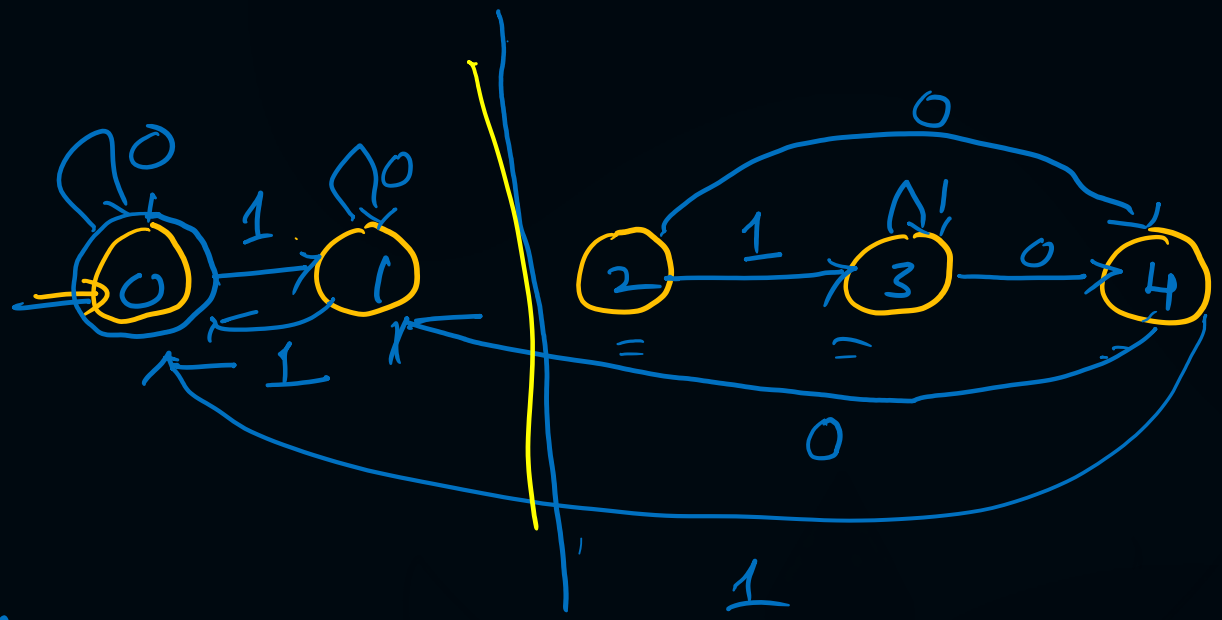
$\delta(2,1) = |4-1| \bmod 5 = 3$ ✓

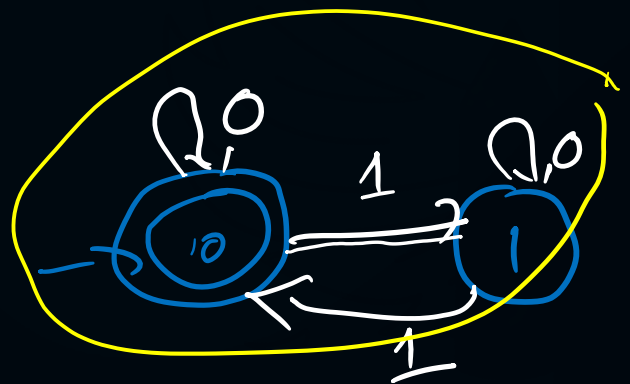
$\delta(3,0) = |9-0| \bmod 5 = 4$ ✓

$\delta(3,1) = |9-1| \bmod 5 = 3$ ✓

$\delta(4,0) = |16-0| \bmod 5 = 1$ ✓

$\delta(4,1) = |16-1| \bmod 5 = 0$ ✓





[MCQ] Consider the DFA ,M with states Q={0,1,2,3,4}, input alphabet $\Sigma = \{0,1\}$ start state 0, final state 0 and transition function $\delta(q,i)=|q^2 - i| \bmod 5$ $q \in Q$, input alphabets are {0,1}

#Q. The number of states in the minimal finite automata ,which is equivalent to M is

A 1

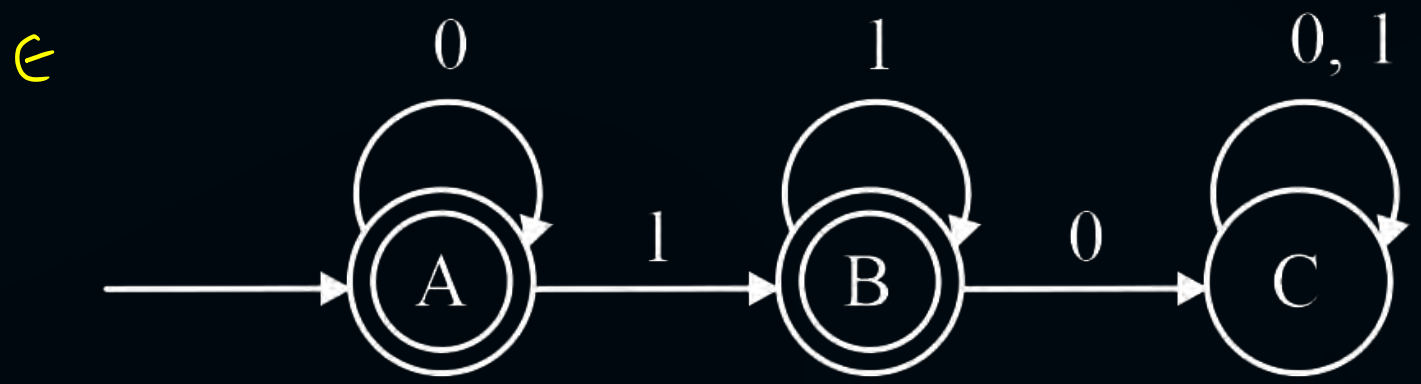
B 2

C 3

D 4

[MCQ]

#Q. The regular expression for the language recognized by the following finite automata is?



A (0 + 1)*

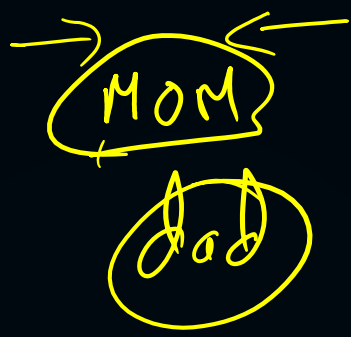
B 0(0 + 1)*1

C 0*1*

D 0*(0 + 1)*1*

[MCQ]

#Q. Choose the regular language from the following



A. $L = \{x/x \in (a + b)^*\}$ and is even length palindrome

B. $L = \{a^n / n \geq 1\}$ → Regular

C. $L = \{a^n b^{2n} / n \geq 1\}$ → non Regular

D. दवदम

[MCQ]

#Q. Which of the following regular expression represents all strings of a's and b's where the length of the string is at most 'n' is

A $(a + b)^n$ → exactly $\in, 1, 2, \ldots n$

B $(a+b)^n(a+b)^*$ → atleast n

C $(a + b + \varepsilon)^n$ → atmost n ✓ C

D None of the above

[MCQ]

#Q. Which of the following pair of regular expressions are not equal

A. $(r^*)^*$ and $(r^*)^*$ → equal

B. $(r + \varepsilon)^*$ and r^* → equal

C. $(r + \varepsilon)^*$ and r^* $= \{\epsilon, r, r^2, r^3\}$ → not equal

D. None of the above

[MCQ]

#Q. Consider the language S^*, where S is all strings of a's and b's with odd length. The other description of this language is.

$$S^* = [(a+b)[(a+b)(a+b)]^*]^*$$

$$= [(a+b)\in]^* = (a+b)^*$$

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

B. All even length strings of a's and b's

C. All odd length strings of a's and b's

D. None of the above

[MCQ]

#Q. Let r= (1 + 0)* s = 11 *0 and t = 1*0 be three regular expressions. Which one of the following is true?

t = {0, 10, 110, 1110 ...}

S = {10, 110, 1110 ...}

A. $L(s) \subset L(r)$ and $L(s) \subset L(t)$

B. $L(r) \subset L(s)$ and $L(s) \subset L(t)$

C. $L(t) \subset L(s)$ and $L(s) \subset L(r)$

D. None of the above

THANK - YOU