

CSc 220

11/10/2020

R.E.



RE : All bit strings $(0+1)^*$

L a set of all 0's.

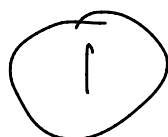
$0 \in L$ 0, 00, 000, ... 1?

$$L = \{ 0^n \mid n \in \mathbb{N}, n \geq 1 \}$$

$$L = \left\{ \begin{array}{cccc} 0, & 00, & 000, & 0000, & \dots \\ 1 & 2 & 3 & 4 \end{array} \right\}$$

$$0.0^*$$

$$0^*.0$$



All bitstrings with at least One 1 at the beginning and end with at least one 1.

$$(0+1)^* \cdot 1$$

$$1 \cdot (0+1)^* \cdot 1$$

$$\lambda \notin L$$

$$1 \in L$$

$$11 \in L$$

$$101 \in L$$

}

$$1 + 1 \cdot (0+1)^* \cdot 1 \quad \checkmark$$

(2)

. Contains at least 3 consecutive 1's

$(0+1)^*$ X

111 ✓

1110 ✓

0111 ✓

110111 ✓

✓ $(0+1)^*$ 111 $(0+1)^*$

3

Determine whether 11101 is in each of these sets:

$$a) \{0,1\}^*$$

$$b) \{1\}^* \{0\}^* \{1\}^*$$

$$c) \{111\}^* \{0\}^* \{1\}$$

$$d) \{11\} \{0\}^* \{01\}$$

$$e) \{11\}^* \cdot \{01\}^*$$

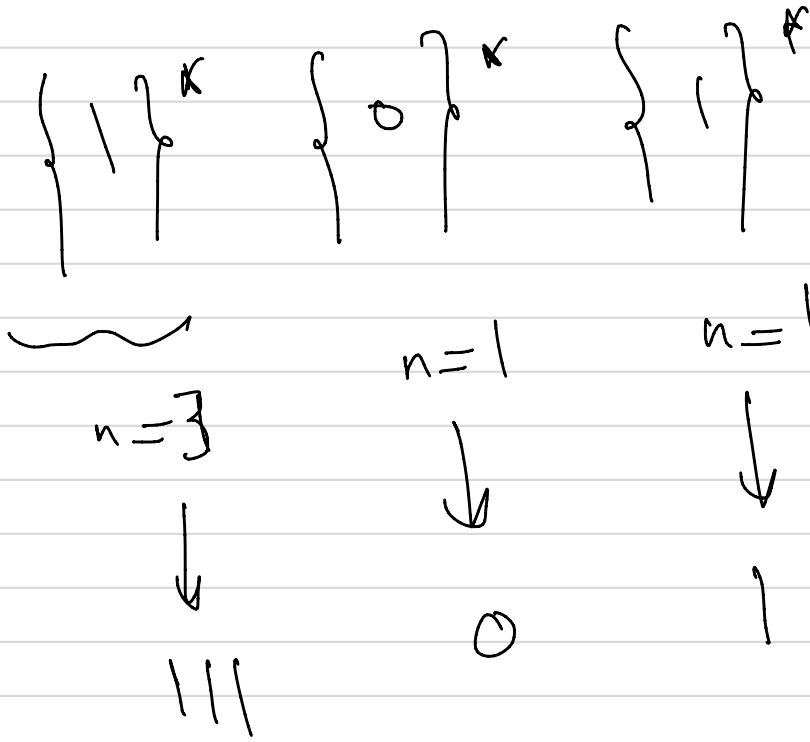
$$f) \{11,0\} \cdot \{00,101\}$$

4

a) yes it contains everything.

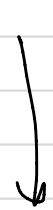
b) "11101"

yes



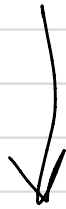
5

c) $\{1111\}^*$. $\{0\}^*$ $\{1\}$ "11101"



$n=1$

111



$n=1$

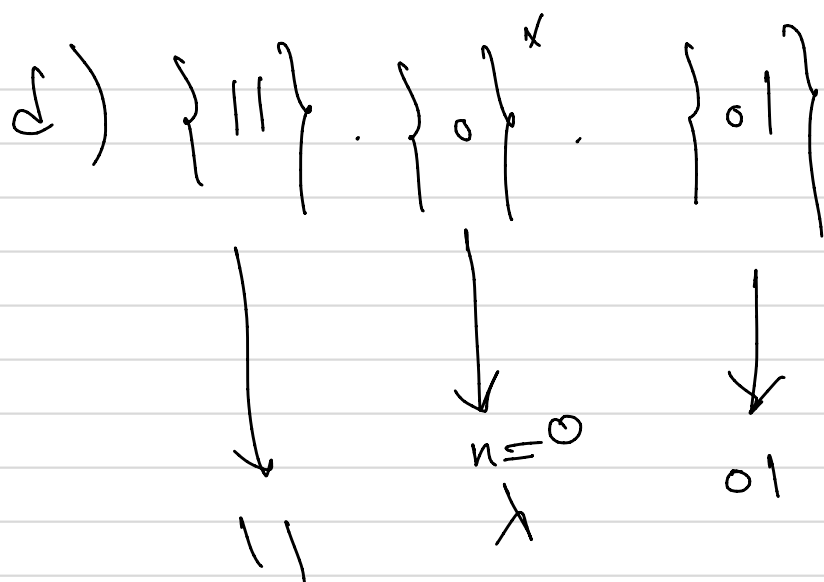
0



1

yes

6



No

11101

7

e) $\{111\}^*$ $\{01\}^*$

11101



11, 1111, ...

No

8

$$f) \{11, 01\} \cdot \{00, 101\}$$

yes

" "
 11101

$$11 \cdot 101 = 11101$$

✓

Find A and B?

$$A \cdot B = \{ \underline{1}0, 111, \underline{1}0\underline{1}0, \underline{1}000, \underline{1}0111, \underline{1}01000 \}$$

i) $A = \{\lambda\}$ $B \rightarrow$ The entire set

ii) $A = \{1, 101\}$ $B = \{0, 11, 000\}$

$$\{10, 111, 1000, 1010, 10111, 101000\}$$

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Find RE for $\{ a^n b^m \mid n \geq 3, m \text{ even} \}$

aaa	$n=3 \quad b=0$
aaa bb	$n=3 \quad b=2$
⋮	$n=4, \quad b=0$
⋮	⋮

<u>aaa</u>	<u>a^*</u>	<u>$(bb)^*$</u>
3	+1	even #
	+2	0
	+3	2
	⋮	4
	⋮	6
	⋮	⋮
	⋮	⋮
	⋮	⋮

(10)

$$\{a^n b^m \mid (n+m) \text{ is even}\}$$

n, m are both odd

n, m are both even

$$\underbrace{(aa)^* (bb)^*}_{\text{even}} + \underbrace{a(aa)^* b(bb)^*}_{\text{odd}}$$

$$a(aa)^* = (aa)^* a$$

II