Turing Machine - I

Complete Course on Theory of Computation

Subbarao Lingamgunta • Lesson 34 • Mar 22, 2022

Give CFG $L = \{ (a+b)^* \, abb \, (a+b)^* \}$

$S \rightarrow A \, abb \, A$

$A \rightarrow aA \mid bA \mid \epsilon \Rightarrow (a+b)^*$

Give CFG $L = \{ (\underline{baa} + \underline{abb})^* \}$ $\underline{a}$ $\underline{b}$

$S \rightarrow baaS \mid abbS \mid \epsilon$

Give CFG $L = \{ a^n b^n \mid n \geq 1 \}$

$S \rightarrow asb \mid ab$

$a^m b^n \mid m, n \geq 1$

$S \rightarrow AB$

$A \rightarrow aA \mid a$

$B \rightarrow bB \mid b$

Give CFG $L = \{ b^n a^{2n} \mid n \geq 0 \}$

$S \rightarrow b\ S\ aa \mid \epsilon$

Give CFG $L_1 = \{ a^m b^n c^n \mid m, n \geq 1 \}$

(a^m : A, $b^n c^n$: B)

CFL

$S \rightarrow AB \Longrightarrow a^m b^n c^n \mid m, n \geq 1$

$A \rightarrow aA \mid a \Longrightarrow a^m \mid m \geq 1$

$B \rightarrow bBc \mid bc \Longrightarrow b^n c^n \mid n \geq 1$

$L_2 = \{ a^m b^m c^n \mid m, n \geq 1 \}$

A B

$S_2 \rightarrow AB$

$A \rightarrow aAb \mid ab$

$B \rightarrow cB \mid c$

CFG

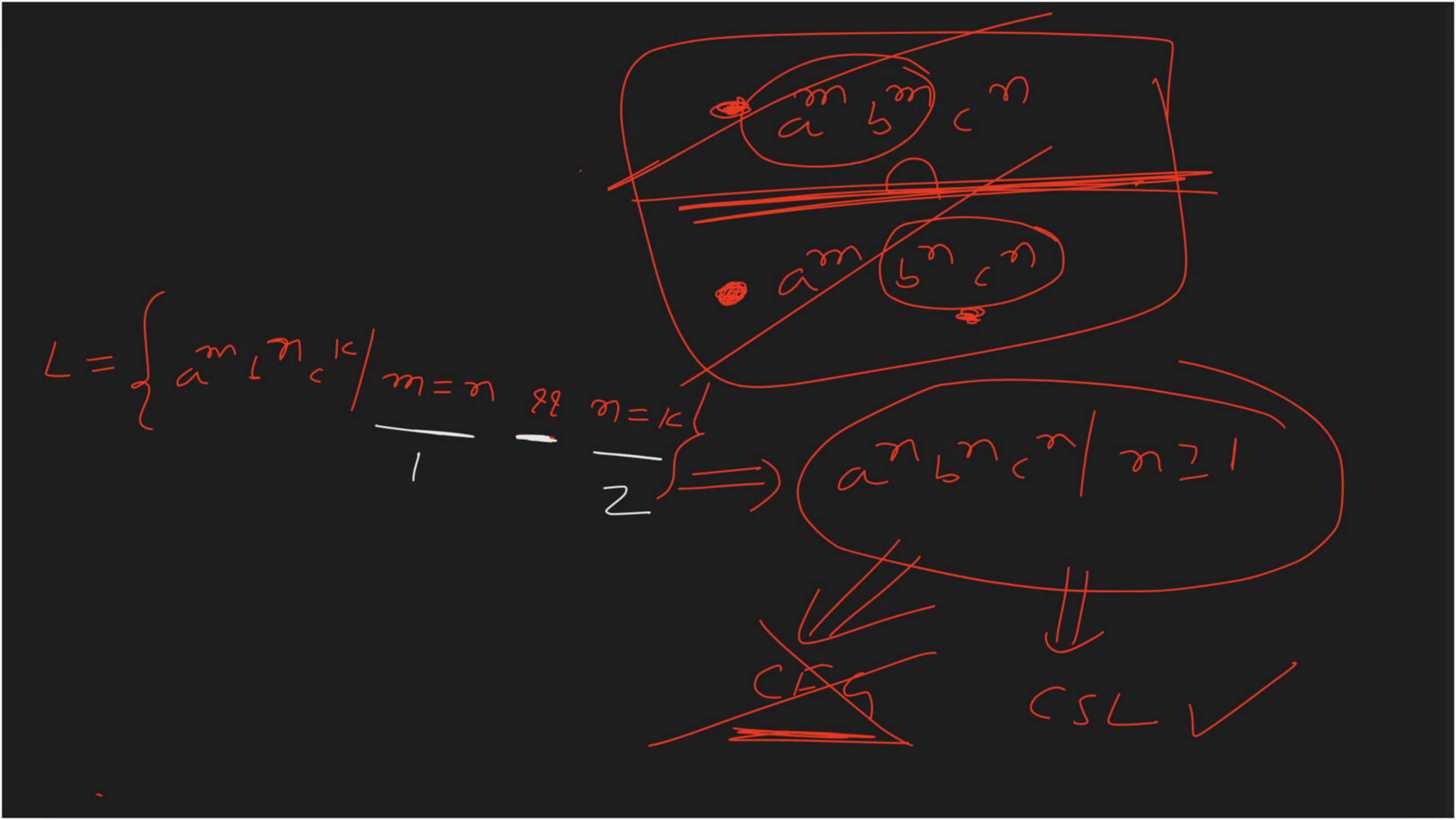
CFL

CFL

$S \rightarrow S_1 \mid S_2$

$L = \{ a^m b^n c^k \mid m = n \text{ or } n = k \}$

$L_1 \cup L_2$


$a^m b^m c^m$
$a^m b^m c^m$
$L = \{ a^m b^n c^k \mid m = n \text{ or } n = k \}$
1
2
$a^n b^n c^n \mid n \geq 1$
CFG
CSL

If L_1 & L_2 are CFL's then

(1) $L_1 \cup L_2$ is also CFL

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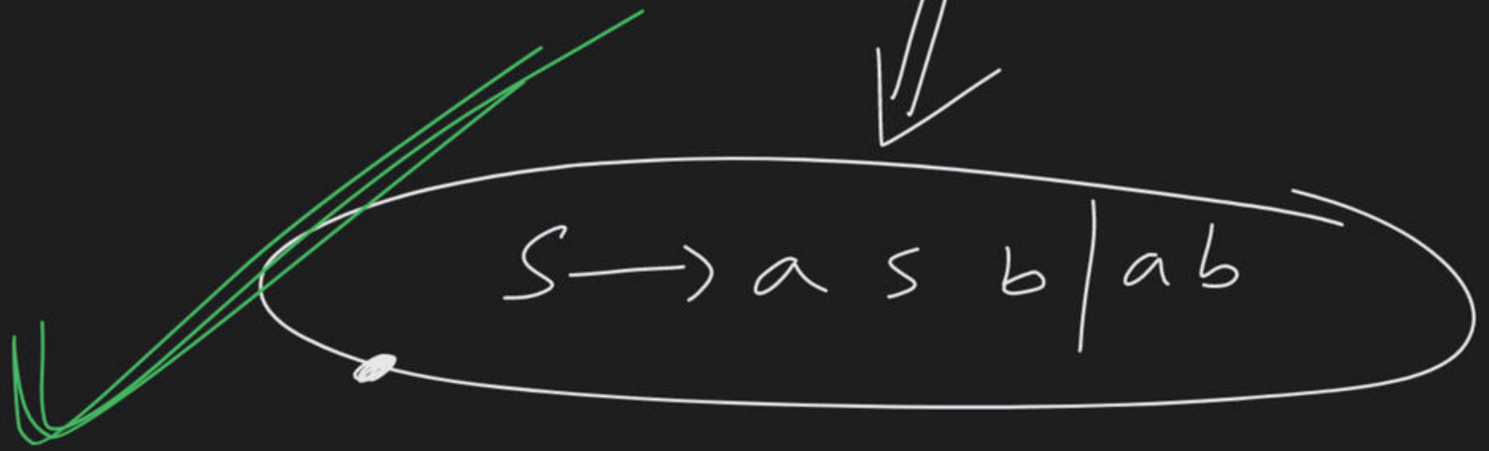
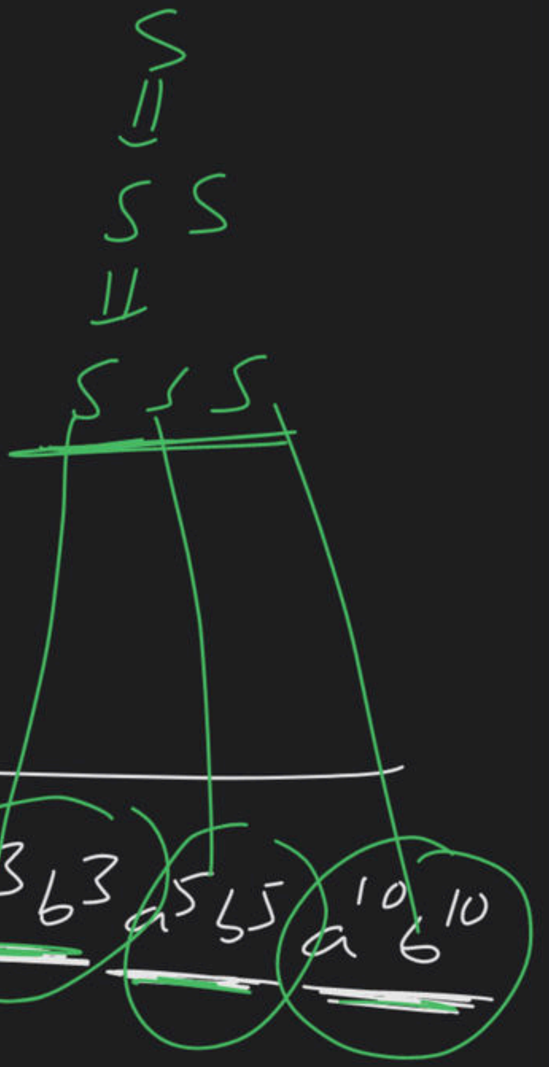
(2) $L_1 \cap L_2$ need not be CFL

Give CFG $L = \{a^n b^n / n \geq 1\}$





$L^* \Longrightarrow (a^n b^n)^* \Longrightarrow a^3 b^3 \; a^5 b^5 \; a^{10} b^{10}$

$S \rightarrow asb / ab / SS / \epsilon$

Give CFG $L = \{$ set of all palindromes over alphabet $\{a, b\}$ $\}$

$S \rightarrow asa \mid bsb \mid \epsilon \mid a \mid b$

ϵ

a

b

aa

bb

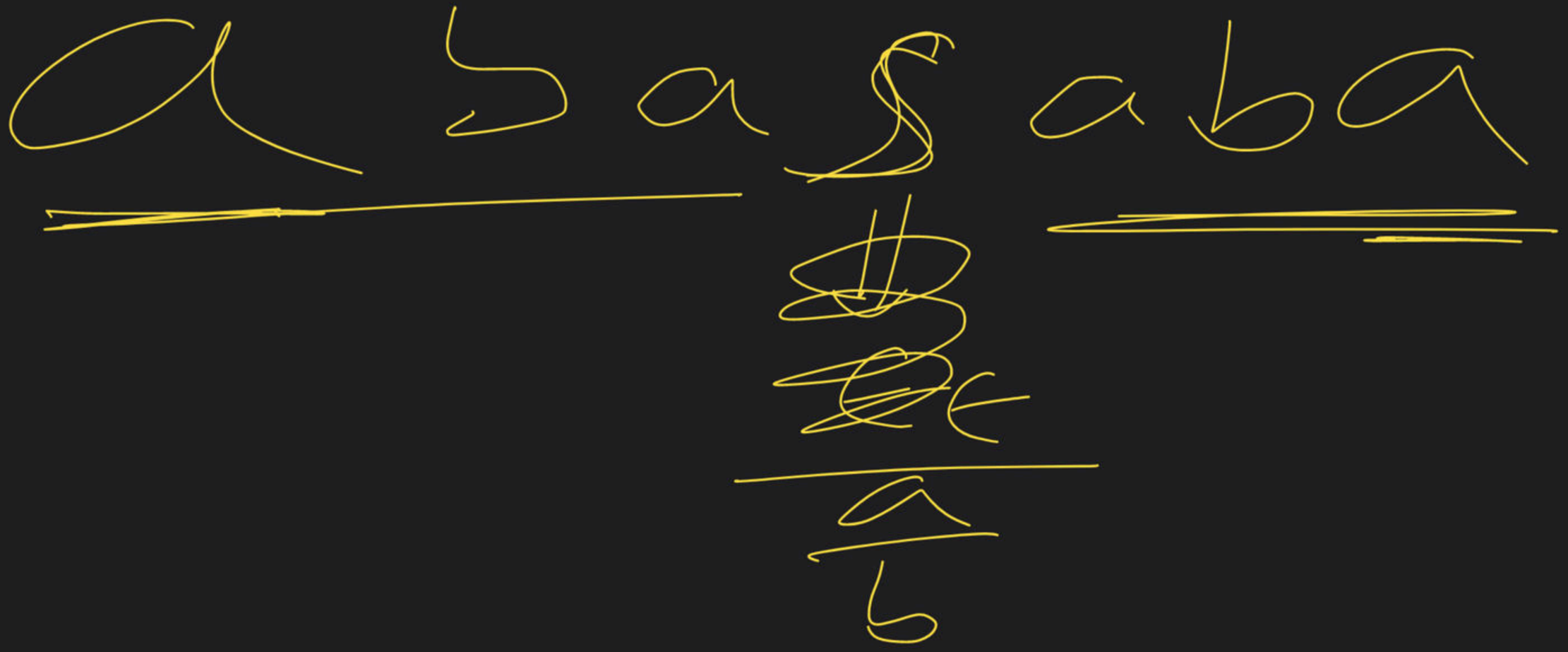
aba

bab

. . . . .

Thanks

Dedicate Help



If L is CFL then L^R also CFL