Regular Expression - III

Complete Course on Theory of Computation

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GRE $L = \{$ all strings of a's & b's including $\epsilon\}$

$(a+b)^* = \epsilon, a, b, aa, bbb, a^{10}b^{20}, \ldots\ldots$

$(a^*+b)^* = \epsilon, a^{10}, a^{10}b^{20}, \ldots\ldots\ldots\ldots$

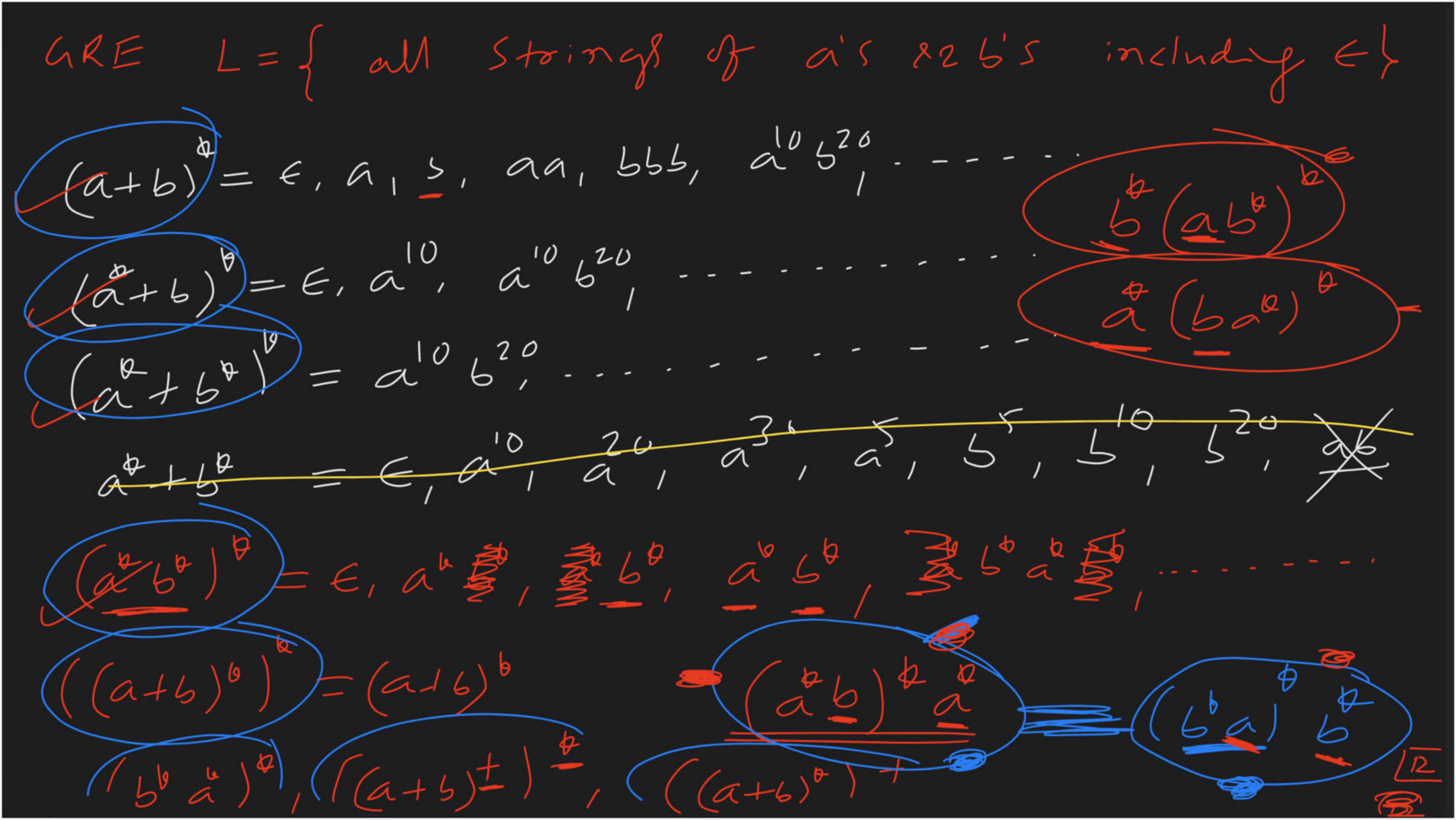
$(a^*+b^*)^* = a^{10}b^{20}, \ldots\ldots\ldots\ldots$

$a^*+b^* = \epsilon, a^{10}, a^{20}, a^{30}, a^5, b^5, b^{10}, b^{20}, ab$

$(a^*b^*)^* = \epsilon, a^*b^*, a^*b^*, a^*b^*, a^*b^*, \ldots\ldots\ldots$

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

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



12

(13) $(a\bar{b}^{*} + b\bar{a}^{*})^{*}$

(14) $(\bar{b}^{*}\bar{a} + \bar{a}^{*}\bar{b})^{*}$

① 0^* all ② $(01)^*$ even ③ $(00)^*0$ odd

④ $(00)^*(0+\epsilon) \Rightarrow$ all

equal ?

① && ④

Q6 R.E $0^*(10^*)^*$ Same as

(a) $(1^*0)^*1^*$

(b) $0+(0+10)^*$

(c) $(0+1)^*10(0+1)^*$

0 ✗

1 ✗

ϵ ✗

1 ✗

~~(d) None~~

(a) ✓

GRE $L = \{$ set of all strings over the alphabet $\{0,1,2\}$ in which every 2 is immediately followed by exactly 2-0's && every 1 is immediately followed by 0 (or) 20 $\}$.

$\Longrightarrow$ ϵ, 0, 00, 000, ... 0^*, 200, ~~2000~~, 10, 100

~~120~~ 1200, ..., 1000000

$$0^*(200 + 100^* + 1200)^*$$

40D
40R

NFA construction

NFA construction much easier than DFA construction. Becz NFA will cover only string present in L but DFA will cover every string present in Σ^*

$Q = \{1, 2\}$

$P(Q) = \{\}$, $\{1\}$, $\{2\}$, $\{1, 2\}$

DFA : $\delta : Q \times \Sigma \rightarrow Q$ [V V ✓ I φ]

ε-free-NFA

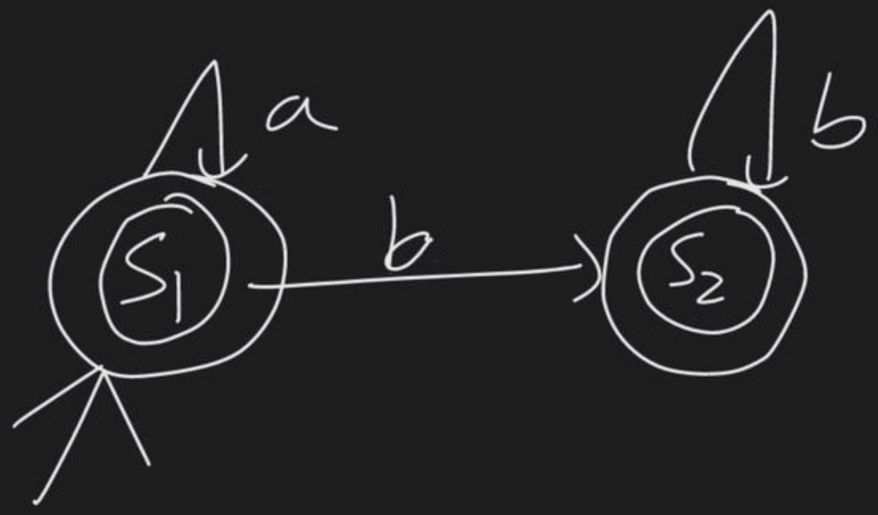
NFA : $\delta : Q \times \Sigma \rightarrow P(Q)$ (or) 2^Q [V V]

ϵ-NFA : $\delta : Q \times \{\Sigma, \epsilon\} \longrightarrow P(Q)$ (or) 2^Q

NFA $L = \{ a^m b^n \mid m, n \geq 0 \}$

$\Longrightarrow \epsilon, a, aa, aaa, \ldots, b, bb, bbb, \ldots, ab, aaabbb$

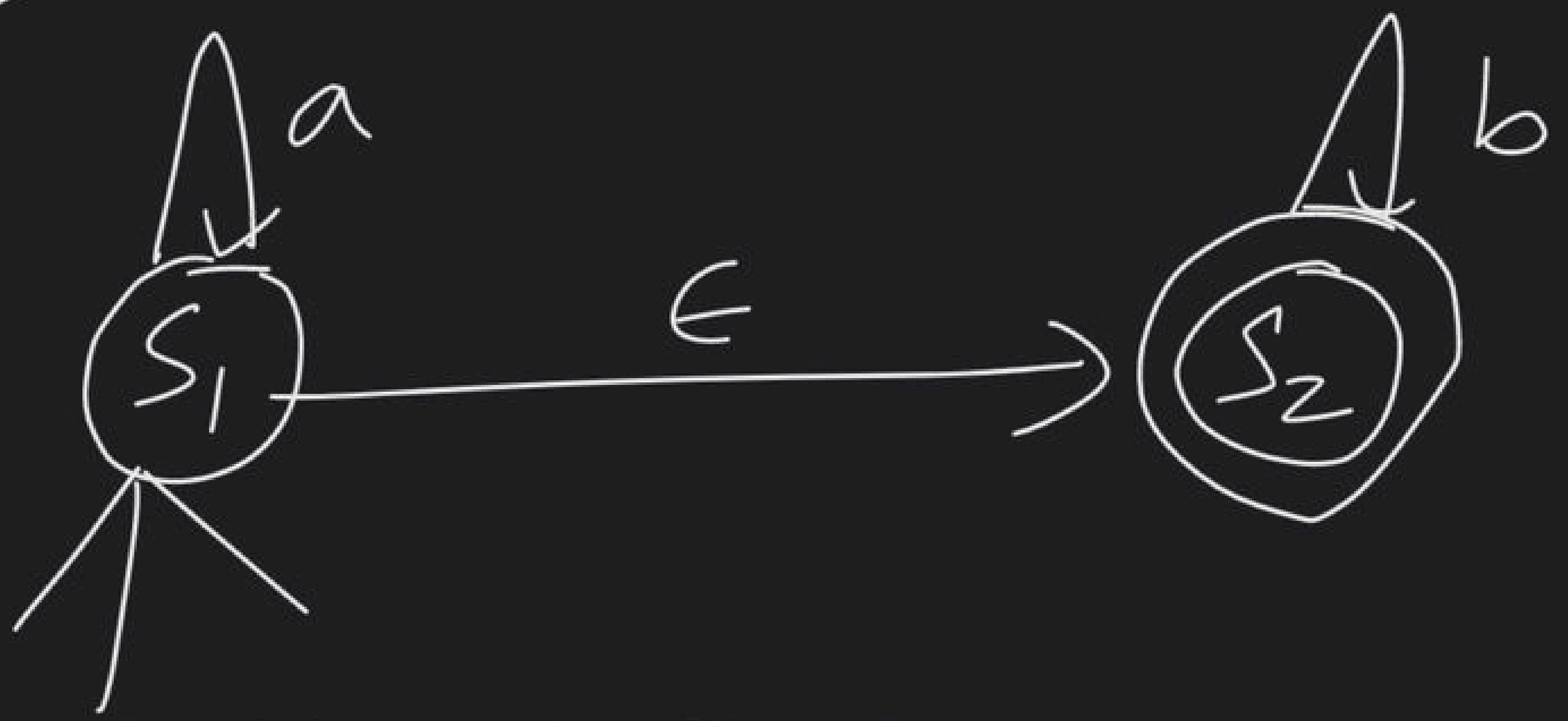
$\ldots\ldots$



E.V ✓

I.I.V b also ✓

ε-NFA



Thanks All

Dedicate Hate