L_1 L_2

$\gamma_1 \cdot \gamma_2$

$L_1 = \{ \epsilon, a \}$

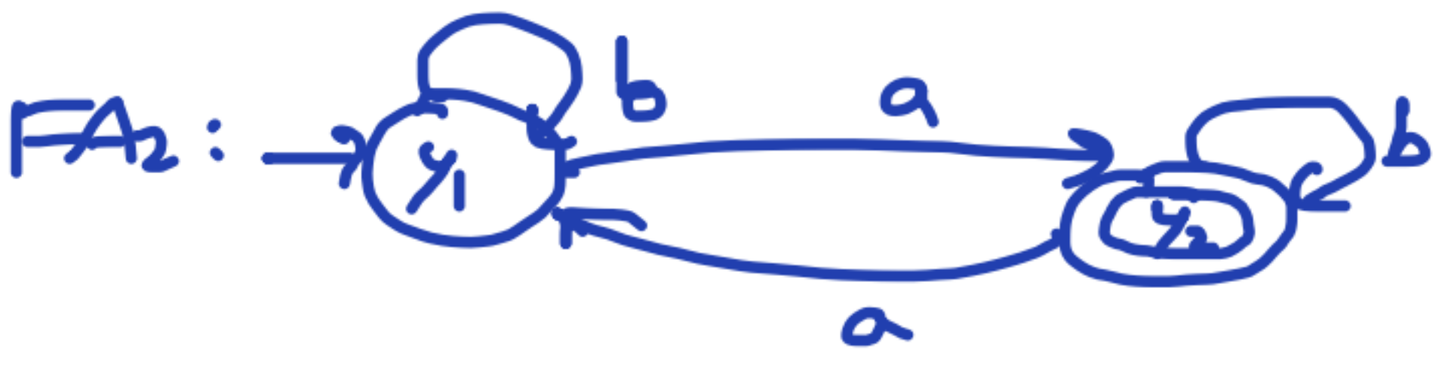
$L_2 = \{ \epsilon, a \}$

$L_1 \cdot L_2 = \{ a, aa, ab, aba \}$

$\gamma_1 \gamma_2 \neq \gamma_2 \gamma_1$

$L_1 L_2 \neq L_2 L_1$

$FA_1 \cdot FA_2 \neq FA_2 \cdot FA_1$



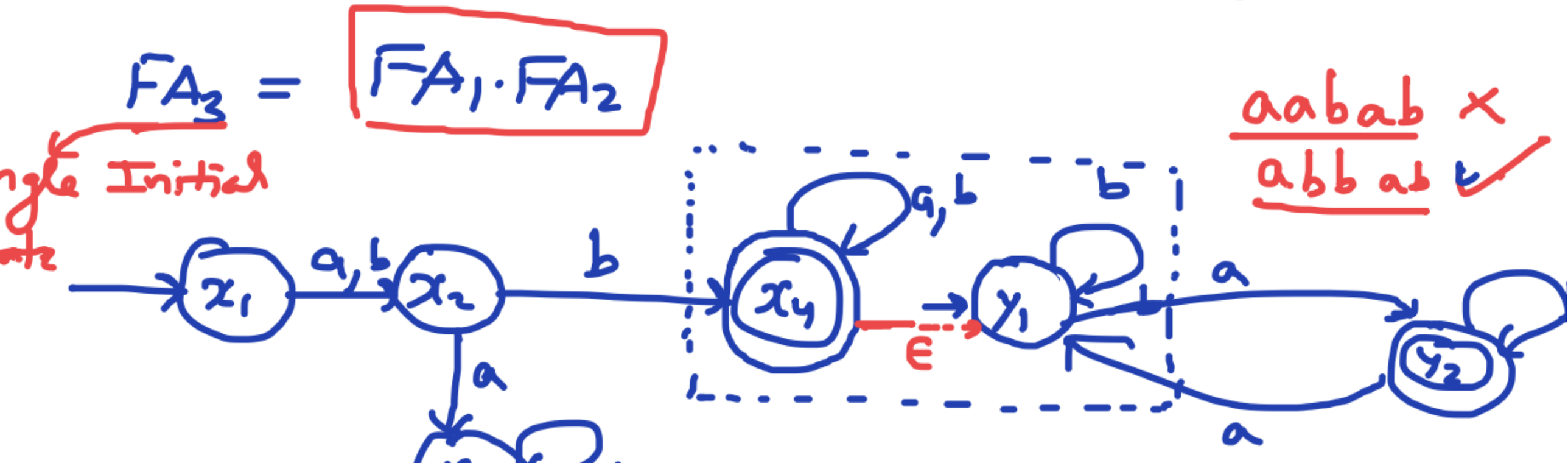
String length

① $|w| >= 2$

② ab, bb

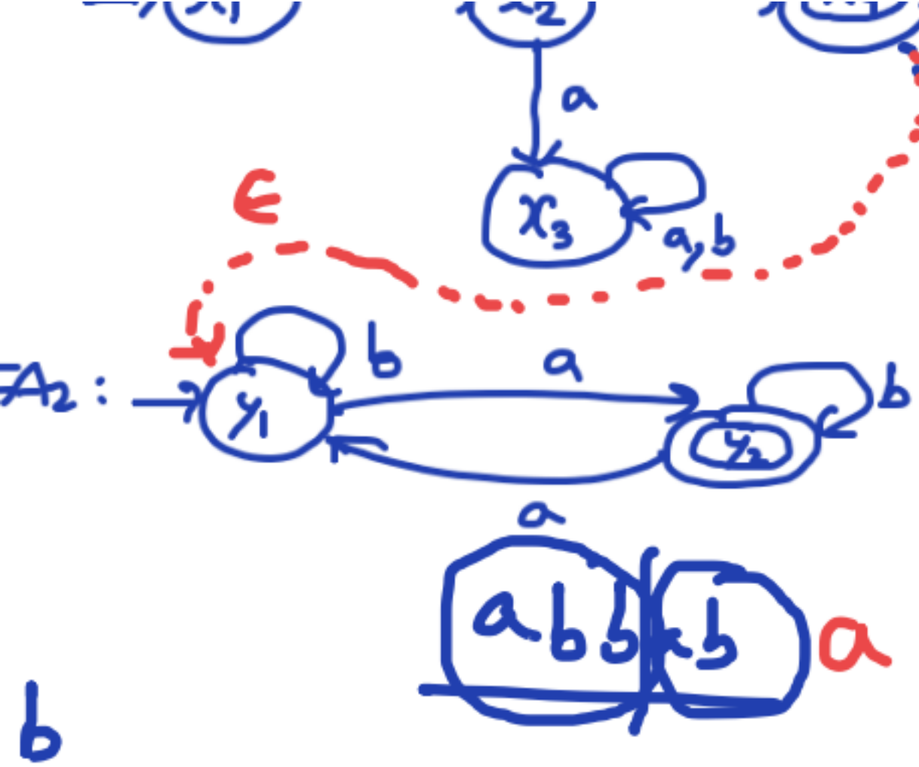
③ Second letter

$FA_3 = FA_1 \cdot FA_2$



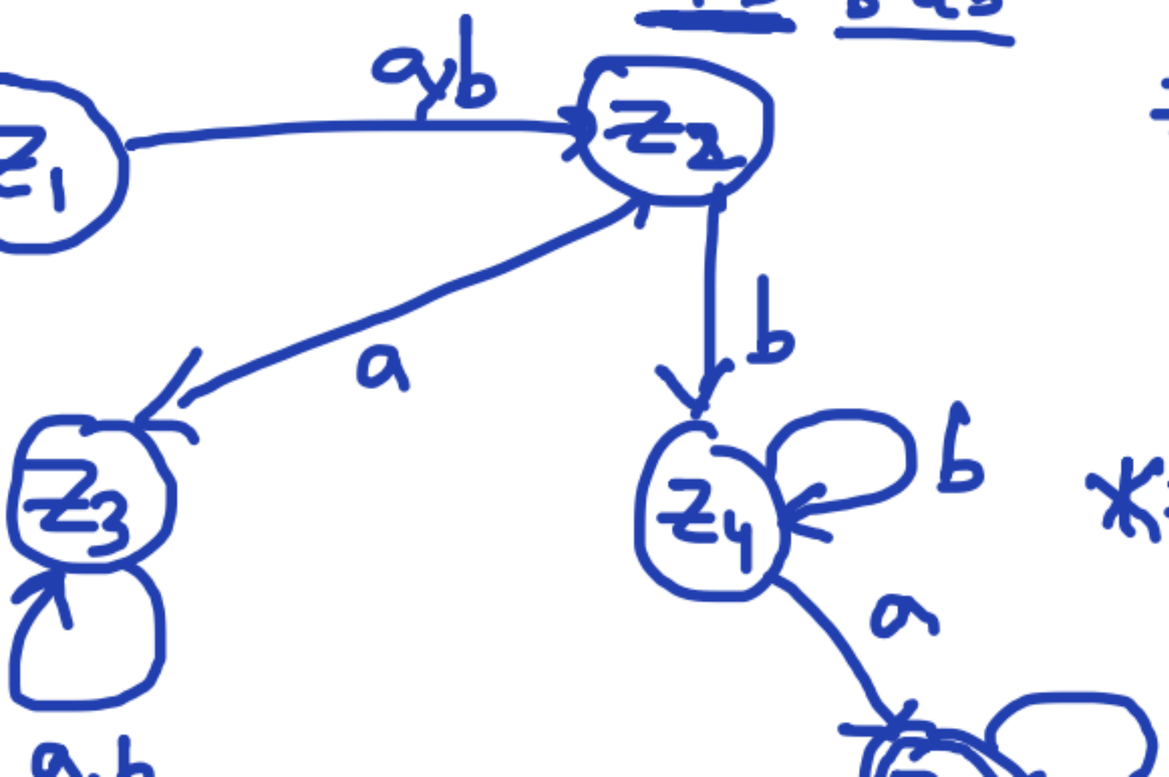
aabab ✗

abbab ✓

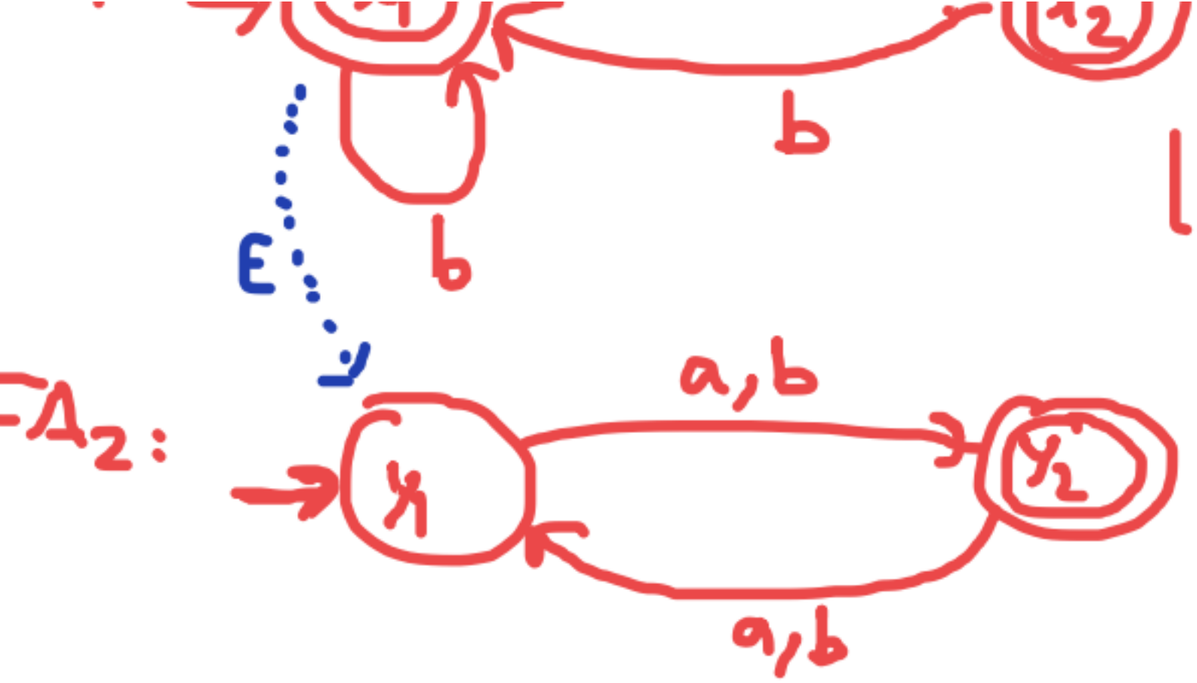


b

a b b a b



Q	Σ: a	b
→ $z_1 = x_1$	$x_2 (= z_2)$	$x_2 (=$
$z_2 = x_2$	$x_3 (= z_3)$	$x_4 \mid y_1 ($
$z_3 = x_3$	$x_4 \mid y_1 \mid y_2 (= z_5)$	$x_3 (=$
$z_4 = x_4 \mid y_1$	$x_4 \mid y_1 \mid y_2 (= z_5)$	$x_4 \mid y_1 \mid y_2$ $= x_4 \mid y_1$ $(= z$
* $z_5 = x_4 \mid y_1 \mid y_2$	$x_4 \mid y_1 \mid y_2 (= z_5)$	$x_4 \mid y_1$ $(= z_5$

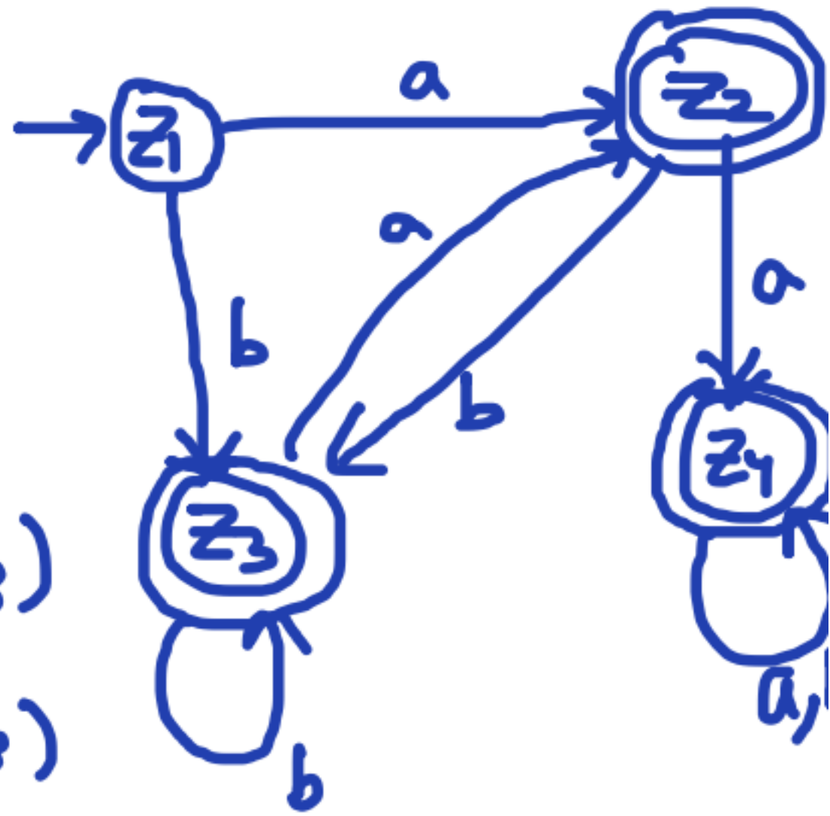


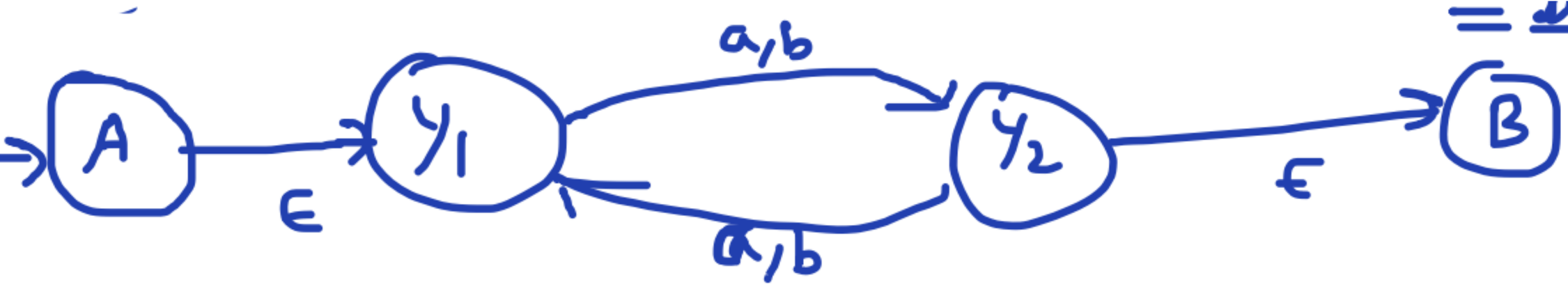
$\longrightarrow (b+ab)^*(a+\epsilon)$

ϵ

find $\dfrac{FA_1 \cdot FA_2}{FA_2 \cdot FA_1}$?

Θ_1 \ Σ	a	b
$z_1 = x_1 \mid y_1$	$x_2 \mid y_1 \mid y_2 \; (= z_2)$	$x_1 \mid y_1 \mid y_2 \; (= z_3)$
$z_2 = x_2 \mid y_1 \mid y_2$	$x_3 \mid y_1 \mid y_2 \; (= z_4)$	$x_1 \mid y_1 \mid y_2 \; (= z_3)$
$z_3 = x_1 \mid y_1 \mid y_2$	$x_2 \mid y_1 \mid y_2 \; (= z_2)$	$x_1 \mid y_1 \mid y_2 \; (= z_3)$



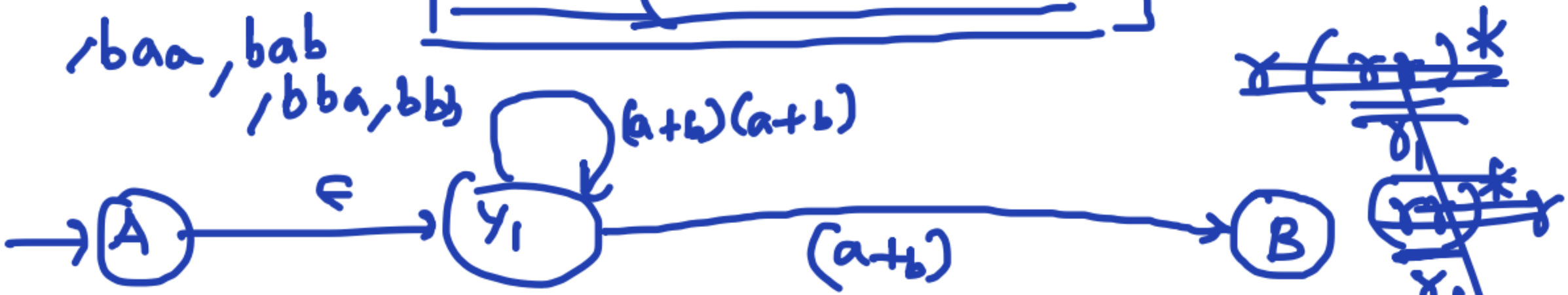


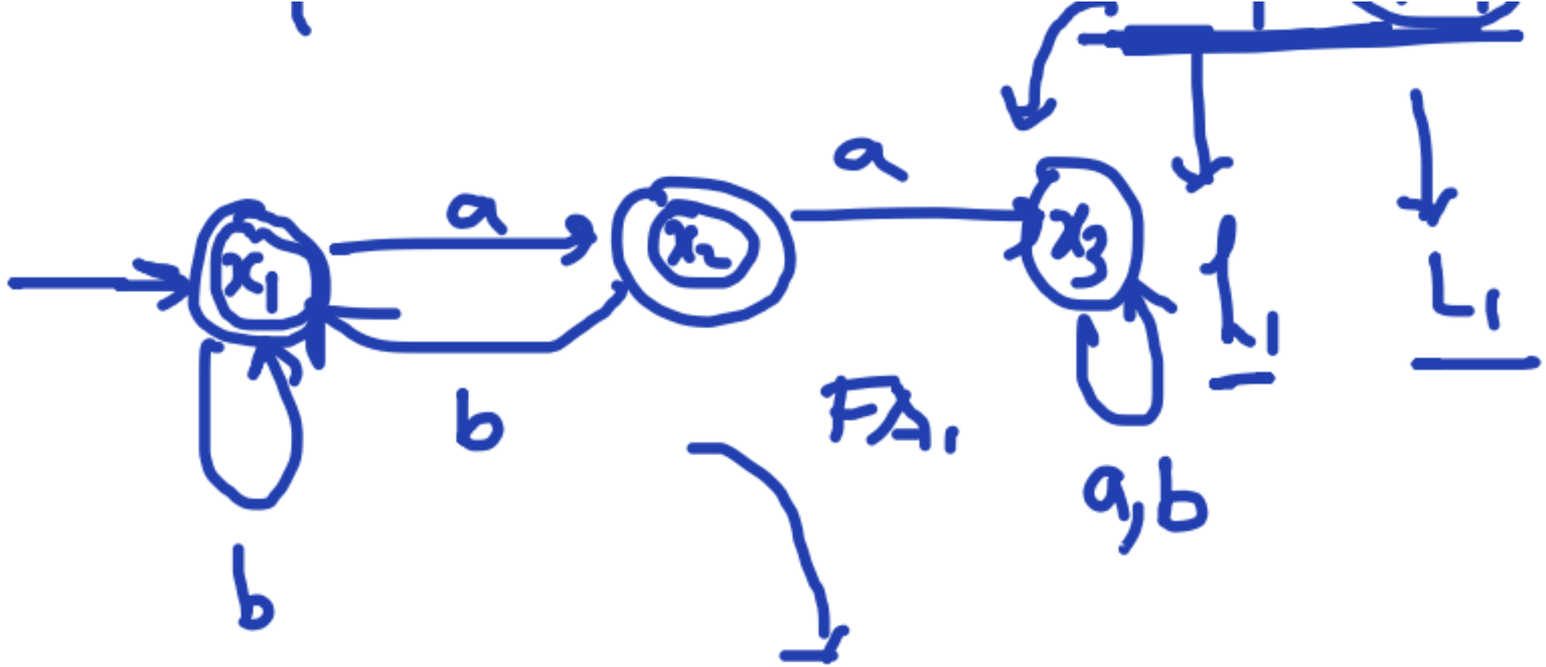
$(a+b)(a+b)^2$ → not allowed

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

a, b, aaa, aab, aba, abb, baa, bab, bba, bbb

$(a+b)\left((a+b)(a+b)\right)^*$ ✓

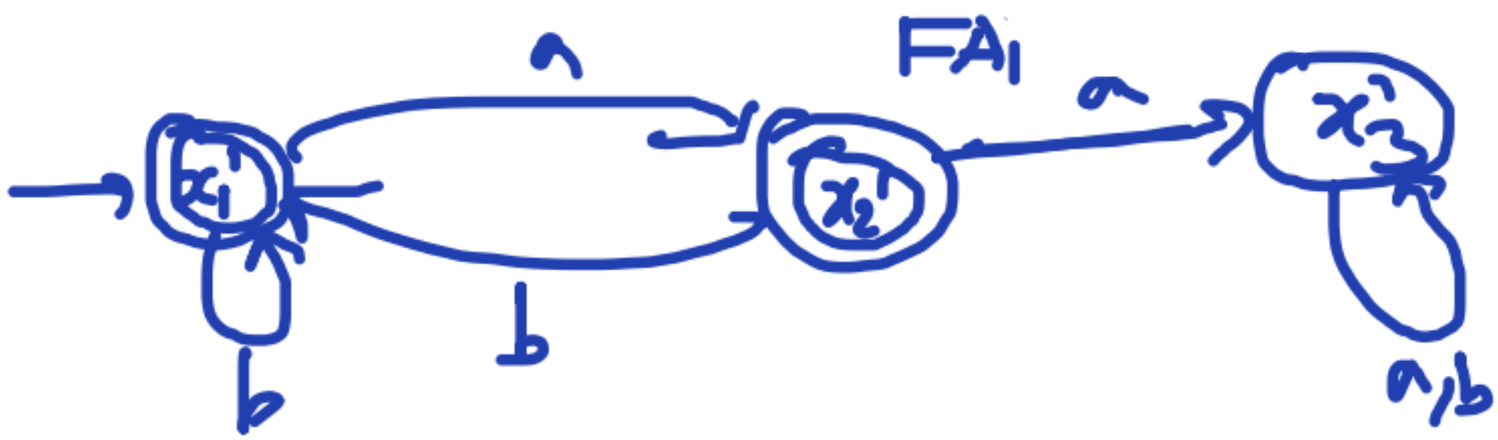




FA_1

$x_1 \mid x_1$

$= x_1$



$$FA_1 \cdot FA_2 \neq FA_2 \cdot FA_1$$