Exemplo 3: Código de Huffman

a) $S^3 \to$

Símbolos	aaa	aab	aba	baa	bbb	bba	bab	abb
Probabilidade	$\dfrac{729}{10^3}$	$\dfrac{81}{10^3}$	$\dfrac{81}{10^3}$	$\dfrac{81}{10^3}$	$\dfrac{1}{10^3}$	$\dfrac{9}{10^3}$	$\dfrac{9}{10^3}$	$\dfrac{9}{10^3}$

Código de Huffman:

Logo, temos:

$aaa \longrightarrow 0$

$aab \longrightarrow 100$

$aba \longrightarrow 101$

$baa \longrightarrow 1100$

$bba \longrightarrow 11100$

$bab \longrightarrow 11101$

$abb \longrightarrow 11110$

$bbb \longrightarrow 11111$
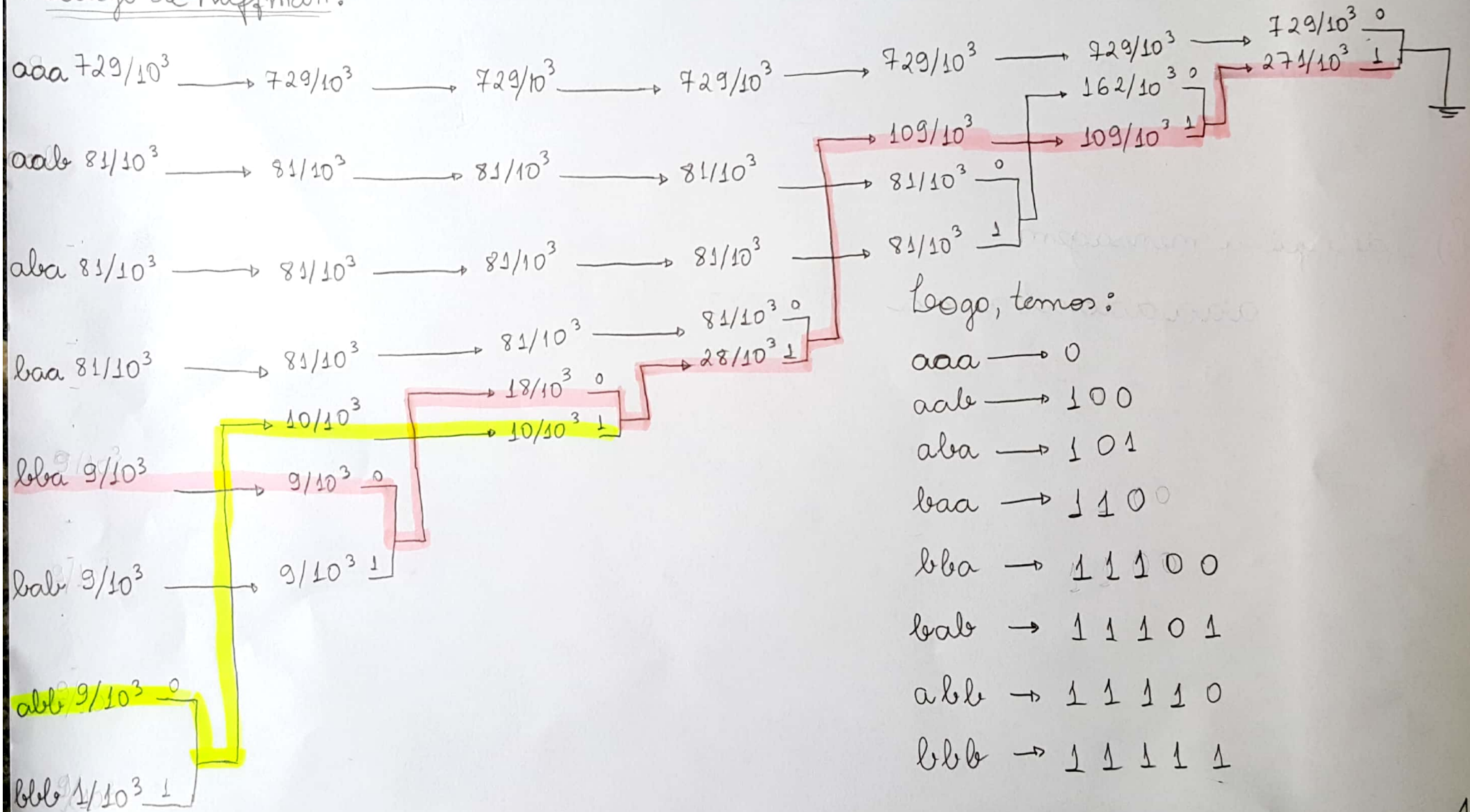
* Cálculo da eficiência:

$$H(S^3) = 3 \times H(S) = 3 \times \left[\frac{9}{10} \times \log_2 \frac{1}{(9/10)} + \frac{1}{10} \times \log_2 \frac{1}{(1/10)} \right] = 3 \times 0,469 = 1,407 \text{//}$$

$$L_3 = 1 \times \frac{729}{10^3} + 3 \times \left(3 \times \frac{81}{10^3} \right) + 3 \times \left(5 \times \frac{9}{10^3} \right) + 5 \times \frac{1}{10^3} = \frac{1598}{10^3} = 1,598 \text{//}$$

$$\eta = \frac{1,407}{1,598} = 0,8805 \times 100\% = 88,05\%$$

b) Codifique a mensagem:

$$\underset{0}{aaa} | \underset{0}{aaa} | \underset{101}{aba} | \underset{0}{aaa} \longrightarrow 001010$$