

## Lista 2 - FTC

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### Questão 1.

- $\Sigma = a, b$  e  $Pb = b, b$
- **Base:**  $\lambda \in PB$
- **Passo Recursivo:**  $W \in Pb$  e  $\alpha \in \Sigma$  então  $\alpha W, W\alpha, Wb, bW, Wbb, bbW \in Pb$
- **Fechamento:**  $R$  é um conjunto de Strings sobre o alfabeto  $\Sigma$  se, e somente se, puder ser obtida a partir de um número finito de aplicações do passo recursivo sobre os elementos da base.

### Questão 2.

a)

$$\begin{aligned}(ba)^* \times (ba) \times (a^* \times b^* \cup a^* \times \lambda) \\ (ba)^* \times (ba) \times a^* \times (b^* \cup \lambda) \\ (ba)^* \times b \times a \times a^* \times (b^* \cup \lambda) \\ (ba)^* \times b \times (a^+) \times (b^* \cup \lambda) \\ (ba)^* \times b \times a^+ \times (b^* \cup \lambda)\end{aligned}$$

b)

$$\begin{aligned}b^+ \times (a^* \times b^*) \times b \\ b^* \times b \times (a^* \times b) \times b^* \times b \\ b(b^* \times a^* \cup \lambda) \times b^+\end{aligned}$$

### Questão 3.

a)

$$a \times a^+ \cup b^+ \times a^+ \times b^+$$

b)

$$(a \cup b)^* \times a \times a \times (a \cup b)^*$$

c)

$$(b^* \cup a \times b)^* \times a \times a \times (b^* \cup b \times a)^*$$

d)

$$a \times (a \cup c)^* \times b \times (a \cup c)^* \times b \times (a \cup c)^* \times c \times c$$

e)

$$\begin{aligned} & ((a \cup b)^* \times a \times b \times (a \cup b)^* \times b \times a \times (a \cup b)^* \cup (a \cup b)^* \times b \times a \times (a \cup b)^* \times a \times b \times (a \cup b)^*) \cup \\ & ((a \cup b)^* \times a \times b \times a \times (a \cup b)^* \cup (a \cup b)^* \times b \times a \times b \times (a \cup b)^*) \end{aligned}$$

f)

$$\begin{aligned} & ((a \cup b \cup c)^* \times a \times a \times (a \cup b \cup c)^* \times b \times b \times (a \cup b \cup c)^* \times c \times c) \cup \\ & ((a \cup b \cup c)^* \times a \times a \times (a \cup b \cup c)^* \times c \times c \times (a \cup b \cup c)^* \times b \times b) \cup \\ & ((a \cup b \cup c)^* \times b \times b \times (a \cup b \cup c)^* \times a \times a \times (a \cup b \cup c)^* \times c \times c) \cup \\ & ((a \cup b \cup c)^* \times b \times b \times (a \cup b \cup c)^* \times c \times c \times (a \cup b \cup c)^* \times a \times a) \cup \\ & ((a \cup b \cup c)^* \times c \times c \times (a \cup b \cup c)^* \times b \times b \times (a \cup b \cup c)^* \times a \times a) \cup \\ & ((a \cup b \cup c)^* \times c \times c \times (a \cup b \cup c)^* \times a \times a \times (a \cup b \cup c)^* \times b \times b) \cup \end{aligned}$$

g)

$$(a^* \cup b \times c \cup c^*)^*$$

h)

$$(a \cup b \cup c) \times (a \cup b \cup c) \times (a \cup b \cup c)$$

i)

$$(\lambda \cup a \cup b \cup c) \times (\lambda \cup a \cup b \cup c)$$

j)

$$(a \cup b \cup c)^* \times (a \cup b \cup c) \times (a \cup b \cup c) \times (a \cup b \cup c) \times (a \cup b \cup c)^* \times$$

k) Não existe