# Linguagens que não são livres de contexto

$\mathcal{L}_1 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^{f(n)},\ f(n)$ **é o** $n$**-ésimo número de Fibonacci**$\}$

$\mathcal{L}_2 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n,\ n \in \mathbb{N}$ **e** $n$ **é primo**$\}$

$\mathcal{L}_3 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^{n^2},\ n \in \mathbb{N}\}$

$\mathcal{L}_4 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^{n^3},\ n \in \mathbb{N}\}$

$\mathcal{L}_5 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^{n!},\ n \in \mathbb{N}\}$

$\mathcal{L}_6 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^\ell 1^m,\ \ell, m \in \mathbb{N},\ \ell = m^2\}$

$\mathcal{L}_7 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n 1^m,\ m, n \in \mathbb{N}$ **e** $n \leqslant m^2\}$

$\mathcal{L}_8 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^{2n} 1^{n+m},\ m, n \in \mathbb{N},\ n \geqslant m\}$

$\mathcal{L}_9 = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^m 1^n 0^{m \cdot n},\ m, n \in \mathbb{N}\}$

$\mathcal{L}_{10} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n 1^{2n} 0^n,\ n \in \mathbb{N}\}$

$\mathcal{L}_{11} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n 1^n 0^m,\ m, n \in \mathbb{N},\ n \geqslant m\}$

$\mathcal{L}_{12} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n 1^n 0^m,\ m, n \in \mathbb{N},\ m \leqslant 2n\}$

$\mathcal{L}_{13} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n 1^{n+1} 0^{2n},\ n \in \mathbb{N}\}$

$\mathcal{L}_{14} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n 1^m 0^n,\ m, n \in \mathbb{N},\ n > m\}$

$\mathcal{L}_{15} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n 1^m 0^{2m},\ m, n \in \mathbb{N},\ n > m\}$

$\mathcal{L}_{16} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^\ell 1^m 0^n,\ \ell, m, n \in \mathbb{N}^+,\ \ell = \max\{m, n\}\}$

$\mathcal{L}_{17} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^\ell 1^m 0^n,\ \ell, m, n \in \mathbb{N},\ \ell = m \cdot n + 1\}$

$\mathcal{L}_{18} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^\ell 1^m 0^n,\ \ell, m, n \in \mathbb{N}^+,\ \ell > m > n\}$

$\mathcal{L}_{19} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^\ell 1^m 0^n,\ \ell, m, n \in \mathbb{N}^+,\ \ell \neq m,\ m \neq n,\ n \neq \ell\}$

$\mathcal{L}_{20} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^\ell 1^m 0^n,\ \ell, m, n \in \mathbb{N},\ \ell < m,\ \ell + 2m + 3 < n\}$

$\mathcal{L}_{21} = \{w \in \Sigma^* = \{0,1\}^* \mid w = (01)^n(01^n)^m,\ m,n \in \mathbb{N}^+\}$

$\mathcal{L}_{22} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n1(10)^n0^n,\ n \in \mathbb{N}^+\}$

$\mathcal{L}_{23} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^m1^n0^m1^n,\ m,n \in \mathbb{N}\}$

$\mathcal{L}_{24} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^m1^m0^n1^m,\ m,n \in \mathbb{N}\}$

$\mathcal{L}_{25} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^m1^n0^m1^m,\ m,n \in \mathbb{N}\}$

$\mathcal{L}_{26} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^k1^\ell0^m1^n,\ k,\ell,m,n \in \mathbb{N},\ k = 0 \textbf{ ou } \ell = m = n\}$

$\mathcal{L}_{27} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^k1^\ell0^m1^n,\ k,\ell,m,n \in \mathbb{N}^+,\ k < m \textbf{ e } \ell > n\}$

$\mathcal{L}_{28} = \{w \in \Sigma^* = \{0,1\}^* \mid w = uu^R0^{|u|},\ u \in \{0,1\}^*\}$

$\mathcal{L}_{29} = \{w \in \Sigma^* = \{0,1\}^* \mid w = w^R \textbf{ e } |w|_0 = |w|_1\}$

$\mathcal{L}_{30} = \{w \in \Sigma^* = \{0,1\}^* \mid w = uuu,\ u \in \{0,1\}^*\}$

$\mathcal{L}_{31} = \{w \in \Sigma^* = \{0,1\}^* \mid w = uu^Ru,\ u \in \{0,1\}^*\}$

$\mathcal{L}_{32} = \{w \in \Sigma^* = \{0,1\}^* \mid w = uvu^R \textbf{ e } |u| = |v|\}$

$\mathcal{L}_{33} = \{w \in \Sigma^* = \{0,1\}^* \mid w = uvvu^R,\ u,v \in \{0,1\}^*\}$

$\mathcal{L}_{34} = \{w \in \Sigma^* = \{0,1\}^* \mid w = uu^Ruu^Ru,\ u \in \{0,1\}^*\}$

$\mathcal{L}_{35} = \{w \in \Sigma^* = \{0,1\}^* \mid |w| = 2^n,\ n \in \mathbb{N}\}$

$\mathcal{L}_{36} = \{w \in \Sigma^* = \{0,1\}^* \mid |w| = n \cdot \sqrt{n},\ 42 \leqslant n \in \mathbb{N}^+\}$

$\mathcal{L}_{37} = \{w \in \Sigma^* = \{0,1\}^* \mid w = 0^n\#1^{2n}\#0^{3n},\ n \in \mathbb{N}\}$

$\mathcal{L}_{38} = \{w \in \Sigma^* = \{0,1\}^* \mid w = u\#v,\ u,v \in \{0,1\}^* \textbf{ e } u \textbf{ é subcadeia de } v\}$

$\mathcal{L}_{39} = \{w \in \Sigma^* = \{0,1\}^* \mid w = u\#v,\ u,v \in \{0,1\}^*,\ |u| = |v| \textbf{ e } u \neq v\}$

$\mathcal{L}_{40} = \{w \in \Sigma^* = \{0,1\}^* \mid w = u\#v\#u^R,\ u,v \in \{0,1\}^* \textbf{ e } |u| = |v|\}$