Linguagens livres de contexto:

Linguagens definidas sobre o alfabeto $\Sigma = \{0, 1\}$:

$\mathcal{L}_1 = \{w \in \Sigma^* \mid |w|_0 > |w|_1\}$.

$G_1 = (V, \Sigma, P, S) = (\{S\}, \{0, 1\}, P, S)$, com:

$$P = \{\ S \to SS \mid 0S1 \mid 1S0 \mid 0S \mid 0\ \}.$$

$\mathcal{L}_2 = \{w \in \Sigma^* \mid w = 0u0 \text{ ou } w = 1u1,\ |w|_0 = |w|_1,\ u \in \Sigma^+\}$.

$G_2 = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 1A00A1 \mid 0A11A0, \\ A \to AA \mid 0A1 \mid 1A0 \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_3 = \{w \in \Sigma^* \mid w \neq 0^n1^m,\ m, n \in \mathbb{N},\ n = 2m \text{ ou } m = 2n\}$.

$\mathcal{L}_4 = \{w \in \Sigma^* \mid w = 0^n10^n,\ n \in \mathbb{N}\}$.

$G_4 = (V, \Sigma, P, S) = (\{S\}, \{0, 1\}, P, S)$, com:

$$P = \{\ S \to 0S0 \mid 1\ \}.$$

$\mathcal{L}_5 = \{w \in \Sigma^* \mid w = 0^n1^m0^{2n},\ m, n \geqslant 0\}$.

$G_5 = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 0S00 \mid A, \\ A \to 1A \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_6 = \{w \in \Sigma^* \mid w = 0^{2n}1^{3n}0^m,\ m, n \in \mathbb{N}, \}$.

$G_6 = (V, \Sigma, P, S) = (\{S, A, B\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to AB, \\ A \to 00A111 \mid \varepsilon, \\ B \to 0B \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_7 = \{w \in \Sigma^* \mid w = 0^nu,\ u \in \Sigma^*,\ n \in \mathbb{N}^+, |u|_0 \leqslant n\}$.

$G_7 = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 0SA \mid 0A, \\ A \to 0 \mid 1A \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_8 = \{w \in \Sigma^* \mid w = 0^n1^m,\ m, n \in \mathbb{N}, m > n + 2\}$.

$\mathcal{L}_9 = \{w \in \Sigma^* \mid w = u(\overline{u})^R,\ u \in \Sigma^*\}$.

O sufixo $\overline{u}$ é obtido com a troca dos símbolos de u, ou seja, $0 \leftrightarrow 1$.

$G_9 = (V, \Sigma, P, S) = (\{S\}, \{0, 1\}, P, S)$, com:

$$P = \{\ S \to 0S1 \mid 1S0 \mid \varepsilon\ \}.$$

$\mathcal{L}_{10} = \{w \in \Sigma^* \mid w = uuu,\ u \in \Sigma^*\}$.

$\mathcal{L}_{11} = \{w \in \Sigma^* \mid w = uu^Rv,\ u, v \in \Sigma^+\}$.

$G_{11} = (V, \Sigma, P, S) = (\{S, A, B\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \rightarrow AB, \\ A \rightarrow 00 \mid 11 \mid 0A0 \mid 1A1, \\ B \rightarrow 0 \mid 1 \mid 0B \mid 1B \end{array} \right\}.$$

$\mathcal{L}_{12} = \{w \in \Sigma^* \mid w = uv,\ u, v \in \Sigma^+,\ |u|_1 < |v|_0\}$.

$\mathcal{L}_{13} = \{w \in \Sigma^* \mid w = w^R \text{ e } |w| \text{ é par}\}$.

$G_{13} = (V, \Sigma, P, S) = (\{S\}, \{0, 1\}, P, S)$, com:

$$P = \{\ S \rightarrow 0S0 \mid 1S1 \mid \varepsilon\ \}.$$

$\mathcal{L}_{14} = \{w \in \Sigma^* \mid w = (01)^n(10)^n,\ n \in \mathbb{N}\}$.

$G_{14} = (V, \Sigma, P, S) = (\{S\}, \{0, 1\}, P, S)$, com:

$$P = \{\ S \rightarrow 01S10 \mid \varepsilon\ \}.$$

$\mathcal{L}_{15} = \{w \in \Sigma^* \mid w = (0^{i_n}1^{i_n})^n,\ n \in \mathbb{N} \text{ e } i_n \in \mathbb{N},\ \forall\ i_n\}$

$G_{15} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \rightarrow AS \mid A, \\ A \rightarrow 0A1 \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_{16} = \{w \in \Sigma^* \mid w = 0^m1^n0^p,\ m, n, p \in \mathbb{N}^+,\ m + n = p\}$.

$G_{16} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \rightarrow 0S0 \mid 0A0, \\ A \rightarrow 1A0 \mid 10 \end{array} \right\}.$$

$\mathcal{L}_{17} = \{w \in \Sigma^* \mid w = 0^m1^n0^p,\ m, n, p \in \mathbb{N}^+,\ p = m - n\}$.

$G_{17} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \rightarrow 0S0 \mid 0A0, \\ A \rightarrow 0A1 \mid 01 \end{array} \right\}.$$

$\mathcal{L}_{18} = \{w \in \Sigma^* \mid w = 0^m1^n0^p,\ m, n, p \in \mathbb{N}^+,\ m + p = n\}$.

$\mathcal{L}_{19} = \{w \in \Sigma^* \mid w = 0^m1^n2^p,\ m, n, p \in \mathbb{N}, ((m \leqslant n) \text{ ou } (m > n)) \text{ e } m \neq p\}$.

$\mathcal{L}_{20} = \{w \in \Sigma^* \mid w = 0^n1^m0^m,\ m, n \in \mathbb{N}\}$.

$G_{20} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \rightarrow 0S \mid A, \\ A \rightarrow 1A0 \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_{21} = \{w \in \Sigma^* \mid w = 10^n1^n \text{ ou } w = 110^n1^{2n}\ n \in \mathbb{N}^+\}$.

$G_{21} = (V, \Sigma, P, S) = (\{S, A, B\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 1A \mid 11B, \\ A \to 0A1 \mid 01, \\ B \to 0B11 \mid 011 \end{array} \right\}.$$

$\mathcal{L}_{22} = \{w \in \Sigma^* \mid w = 0^n1^n1^m0^m,\ m, n \in \mathbb{N}\}$.

$G_{22} = (V, \Sigma, P, S) = (\{S, A, B\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to AB, \\ A \to 0A1 \mid \varepsilon, \\ B \to 1B0 \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_{23} = \{w \in \Sigma^* \mid w = 0^n1^m0^p1^q,\ m, n, p, q \in \mathbb{N},\ m + n = p + q\}$.

$G_{23} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 0S1 \mid A, \\ A \to 1A0 \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_{24} = \{w \in \Sigma^* \mid w = 0^n1^m0^p1^q,\ m, n, p, q \in \mathbb{N},\ n > m,\ p < q\}$

$G_{24} = (V, \Sigma, P, S) = (\{S, A, B\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to AB, \\ A \to 0A1 \mid 0A \mid 0, \\ B \to 0B1 \mid B1 \mid 1, \end{array} \right\}.$$

$\mathcal{L}_{25} = \{w \in \Sigma^* \mid w = 0^n1^{2m}0^m1^{2n}\ m, n \in \mathbb{N}\}$.

$G_{25} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 0S11 \mid A, \\ A \to 11A0 \mid \varepsilon \end{array} \right\}.$$

$\mathcal{L}_{26} = \{w \in \Sigma^* \mid w = u^n,\ 2 \leqslant n \in \mathbb{N},\ u \in \Sigma^*\}$.

Linguagens definidas sobre o alfabeto $\Sigma = \{0, 1, \#\}$:

$\mathcal{L}_{27} = \{w \in \Sigma^* \mid w = x\#y,\ x, y \in \{0, 1\}^* \text{ e } x^R \neq y\}$.

$\mathcal{L}_{28} = \{w \in \Sigma^* \mid w = x\#y,\ x, y \in \{0, 1\}^*,\ y \neq x^R \text{ e } |x| = |y|\}$.

$\mathcal{L}_{29} = \{w \in \Sigma^* \mid w = x\#y\#z,\ x, y, z \in \{0, 1\}^*,\ |z|_0 = 2 \cdot |y|_1 \text{ e } |x| = 2 \cdot k,\ k \in \mathbb{N}\}$.

$\mathcal{L}_{30} = \{w \in \Sigma^* \mid w = x\#y,\ x, y \in \{0, 1\}^* \text{ e } |x|_0 = |y|_1\}$.

$G_{30} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 0S1 \mid A \mid \#, \\ A \to 1A \mid A0 \mid S \end{array} \right\}.$$

$\mathcal{L}_{31} = \{w \in \Sigma^* \mid w = u\#0^{|u|_0},\ u \in \{0, 1\}^*\}$.

Linguagens extras definidas sobre o alfabeto $\Sigma = \{0, 1, \#\}$:

$\mathcal{L}_{32} = \{w \in \Sigma^* \mid w = 10^n10^n1,\ n \in \mathbb{N}\}$.

$G_{32} = (V, \Sigma, P, S) = (\{S, A\}, \{0, 1\}, P, S)$, com:

$$P = \left\{ \begin{array}{l} S \to 1A1, \\ A \to 0A0 \mid 1 \end{array} \right\}.$$

$\mathcal{L}_{33} = \{w \in \Sigma^* \mid w = 0^m1^nu,\ u \in \{0, 1\}^*,\ m, n \in \mathbb{N},\ |u| = m + n\}$.

$\mathcal{L}_{34} = \{w \in \Sigma^* \mid w = 0^m1^{m+n}0^n,\ m, n \in \mathbb{N}\}$.

$\mathcal{L}_{35} = \{w \in \Sigma^* \mid w = 0^{2m}1^n0^{2n},\ m \in \mathbb{N}^+,\ n \in \mathbb{N}\}$.

$\mathcal{L}_{36} = \{w \in \Sigma^* \mid w = 0^m1^n0^{2m}0^p,\ m, n, p \in \mathbb{N}\}$.

$\mathcal{L}_{37} = \{w \in \Sigma^* \mid w = 0^{3m+n}1^n0^31^m,\ m, n \in \mathbb{N}\}$.

$\mathcal{L}_{38} = \{w \in \Sigma^* \mid w = u\#v\#u^R,\ u, v \in \{0, 1\}^+\}$.

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

$\mathcal{L}_{40} = \{w \in \Sigma^* \mid w = 0^n1^k,\ 1 \leqslant n \leqslant 2k\}$