Tutorial-7

Construct CFGs for the following language.

(1) $L = \{a, b\}^+$

Solve $L = \{a, b, aa, bb, aab, abb, \ldots\}$.

$S \rightarrow aS \mid bS \mid a, b$

(2) $L = \{a^n b^m a^n \mid n \geq 1, m \geq 0\}$.

Solve

$S_1 \rightarrow aSa \mid aa$

$A \rightarrow bA \mid \varepsilon$

$S \rightarrow aAa \mid aa$.

(3) $L = \{(ab)^n \mid n \geq 0$

Solve

CFG =

$S \rightarrow aSb \mid \varepsilon$

(4) $L = \{w \mid n_a(w) = n_b(w)\}$.

Solve

$S \rightarrow aSb \mid A$

$A \rightarrow bSa \mid B$

$B \rightarrow SS \mid \varepsilon$

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Ques $L = \{ a^n b^m c^{n+m} \mid n, m \geq 0 \}$.

Solve

C.F.G

$S \rightarrow aSc \mid B$

$B \rightarrow bBc \mid \varepsilon$

Ques $L = \{ a^n b^m \mid n \neq m \}$.

Solve

C.F.G

$S_1 \rightarrow aSb \mid aA \mid \varepsilon$

$A \rightarrow aA \mid bA \mid \varepsilon$

~~$S \rightarrow aAb$~~

$S_1 \rightarrow aSb \mid A$