# CFG:

$L = \{ 0^n 1^n \}$

$L_2$ { ⊙ Palindrome }

Production rules:

$S \rightarrow 0S1$

$S \rightarrow R$

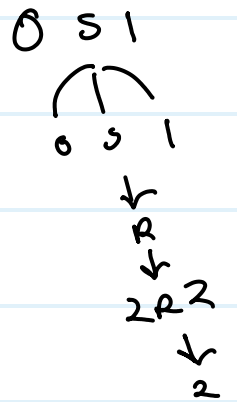
$R \rightarrow \varepsilon$

$S \rightarrow 0S0 \mid 1S1 \mid 0 \mid 1 \mid \varepsilon$

$L = \{ 0^i 2^j 1^k \}$ 00222111

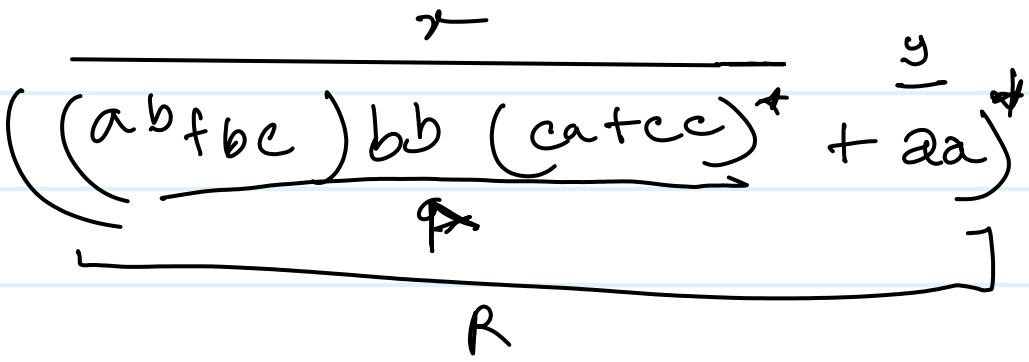
$S \rightarrow 0S1 \mid R$

$R \rightarrow 2R2 \mid \varepsilon \mid 2$




$S \rightarrow 0R0 \mid 1R1 \mid 0 \mid 1$

$R \rightarrow 0R \mid 1R \mid \varepsilon$




$S \rightarrow RS$

$R \rightarrow x \mid y$ $\quad y \rightarrow aa$

$x \rightarrow Ax$

$A \rightarrow BCD$ $\quad C = bb$

$B \rightarrow E \mid F$ $\quad G = HG$

$E \rightarrow ab$ $\quad H \rightarrow I \mid J$

$F \rightarrow bc$ $\quad I = ca$ $\quad J = cc$

L = odd number of 0 and 1

$S \rightarrow 0R1 \mid 1R0$

$R \rightarrow 00R \mid 11R \mid \varepsilon$

$S \rightarrow s+s \mid s*s \mid a \mid b$

# a+a*b

Left

$S \rightarrow S+S$

$\rightarrow a+S$

$\rightarrow a+S*S$

$\rightarrow a+a*S$

$\rightarrow a+a*b$

Right

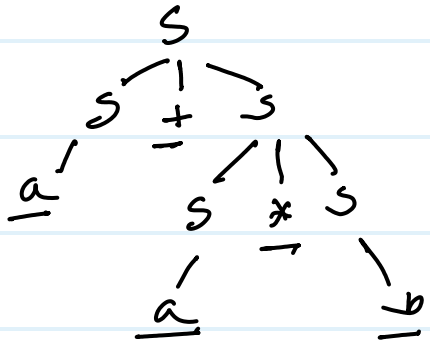
$S \rightarrow S+S$

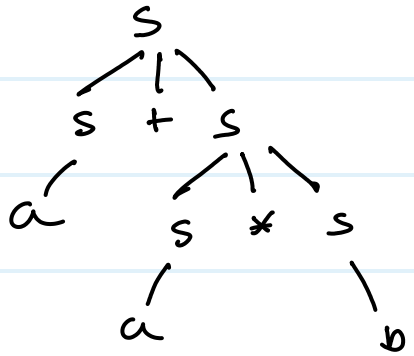
$\rightarrow S+S*S$

$\rightarrow S+S*b$

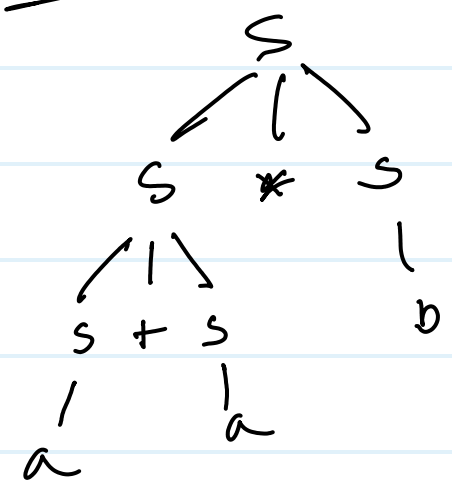
$\rightarrow S+a*b$

$\rightarrow a+a*b$



Leftmost 2




$S * S$

$\rightarrow S + S * S$

$\rightarrow a + S * S$

$\rightarrow a + a * S$

$\rightarrow a + a * b$