

Theoretical Computer Science Tutorial VII

- 1) Show that the following grammar is ambiguous.

$$\begin{aligned} S &\rightarrow aB \mid ab \\ A &\rightarrow aAB \mid a \\ B &\rightarrow ABb \mid b \end{aligned}$$

- 2) Describe the language generated by the following grammar.

$$\begin{aligned} S &\rightarrow aaSb \\ S &\rightarrow A \\ A &\rightarrow CAdd \\ A &\rightarrow Cd \end{aligned}$$

- 3) Eliminate ϵ -productions from G , where G is consisting of following productions.

$$\begin{aligned} \text{a) } S &\rightarrow aSa \mid bSb \mid \epsilon \\ \text{b) } A &\rightarrow aBb \mid bBa \\ B &\rightarrow aB \mid bB \mid \epsilon \end{aligned}$$

- 4) Eliminate unit-productions from CFG, where P is given by

$$\begin{aligned} S &\rightarrow Aa \mid B \\ A &\rightarrow a \mid bc \mid B \\ B &\rightarrow A \mid bb \end{aligned}$$

- 5) Consider CFG, $G = (V_N, \Sigma, P, S)$ where $V_N = \{ S, A, B \}$
 $\Sigma = \{ 0, 1 \}$ and

$$\begin{aligned} P = \{ & S \rightarrow A11B \mid 11A \mid B \mid 11 \\ & A \rightarrow 0 \\ & B \rightarrow BB \} \end{aligned}$$

Remove useless symbols from it.

- 6) Construct CFG without null production from the one which is given below

$$\begin{aligned} S &\rightarrow a \mid Ab \mid aBa \\ A &\rightarrow b \mid \wedge \\ B &\rightarrow b \mid A \end{aligned}$$