

Cosc 362 collected homework for 4/14/17

1. Convert the following grammar into Chomsky normal form:

$$\begin{aligned} S &\rightarrow AB \mid aB \\ A &\rightarrow abb \mid \lambda \\ B &\rightarrow bbA \end{aligned}$$

(Note: this is #5 from the 6th edition of Linz, section 6.2.)

2. Convert the grammar from #1 into Greibach normal form.

3. Use the CYK algorithm to determine whether the string $w = abba$ is in the language generated by the grammar

$$\begin{aligned} S &\rightarrow AS \mid BB \mid a \\ A &\rightarrow AA \mid b \\ B &\rightarrow BS \mid a \end{aligned}$$

Hint: you should start out by finding the following sets of variables,

$$V_{11} = \{S, B\}, \quad V_{22} = \{A\}, \quad V_{33} = \{A\}, \quad V_{44} = \{S, B\},$$

from which we can derive $w_{11}, w_{22}, w_{33},$ and $w_{44},$ respectively.