

CSI 409 — Fall 2017: Homework #5

Some answers and hints

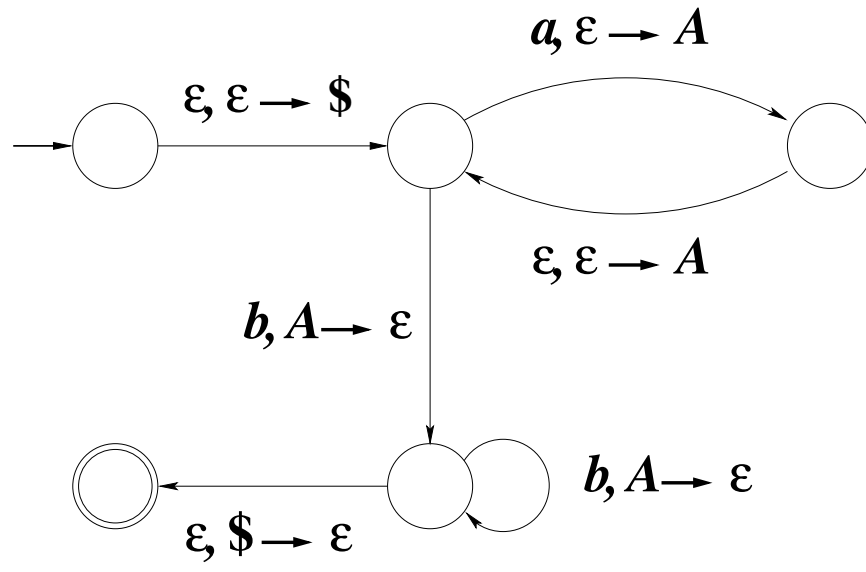
1. Construct the CYK-table for the string *aabb* using the following grammar:

$$\begin{aligned}
 S &\rightarrow AY \mid a \\
 X &\rightarrow AY \\
 Y &\rightarrow XZ \mid XB \mid b \\
 Z &\rightarrow XB \mid b \\
 B &\rightarrow b \\
 A &\rightarrow a
 \end{aligned}$$

| | | | |
|-------------|-------------|----------------|----------------|
| | | | <i>B, Z, Y</i> |
| | | <i>B, Z, Y</i> | |
| | <i>A, S</i> | <i>X, S</i> | <i>Z, Y</i> |
| <i>A, S</i> | | | <i>X, S</i> |

2. Design a pushdown automaton for the following language: (The alphabet is $\{a, b\}$.)

$$\{a^n b^{2n} \mid n \geq 1\}$$



Alternatively, we could use the CFG-to-PDA conversion method (pages 117 through 120 of the textbook) with the grammar

$$S \rightarrow aSbb \mid abb$$