CS 373: Theory of Computation
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Discussion : From PDA to grammar

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Questions on homework 7?

Any questions? Complaints, etc?

1 Converting PDA to a Grammar

Note that the following PDA is designed such that it has the required properties for converting into a grammar:

1. It has a single final state.

2. It empties the stack before accepting.

3. Each transition just pushes one symbol or pops one symbol and not both or none.

Note that its language is $L = \{a^n b^n : n \geq 1\}$.
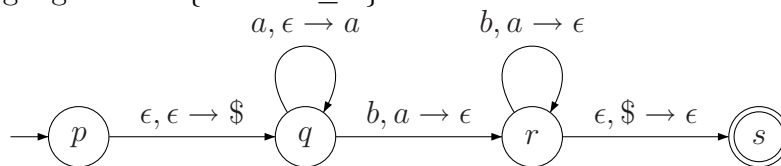
The equivalent grammar is (note that in this case we can simplify it to get our familiar grammar for L):

$$A_{ps} \to \epsilon A_{qr} \epsilon \quad A_{ps} \text{ is the start state}$$
$$A_{qr} \to a A_{qq} b$$
$$A_{qr} \to a A_{qr} b$$
$$A_{pp} \to \epsilon$$
$$A_{pp} \to \epsilon$$
$$A_{qq} \to \epsilon$$
$$A_{rr} \to \epsilon$$
$$A_{ss} \to \epsilon$$
$$A_{xyz} \to A_{xz} A_{zy} \quad \text{for all } x, y, z \in \{p, q, r, s\} \text{ (64 rules)}$$