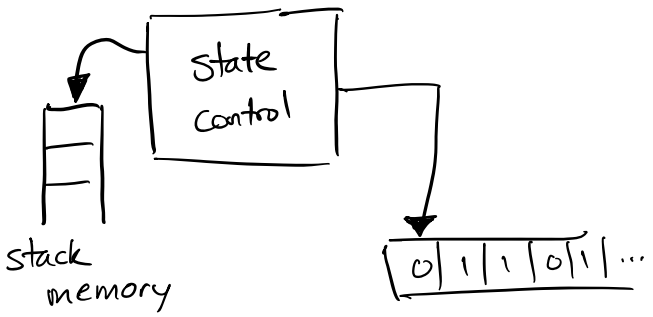
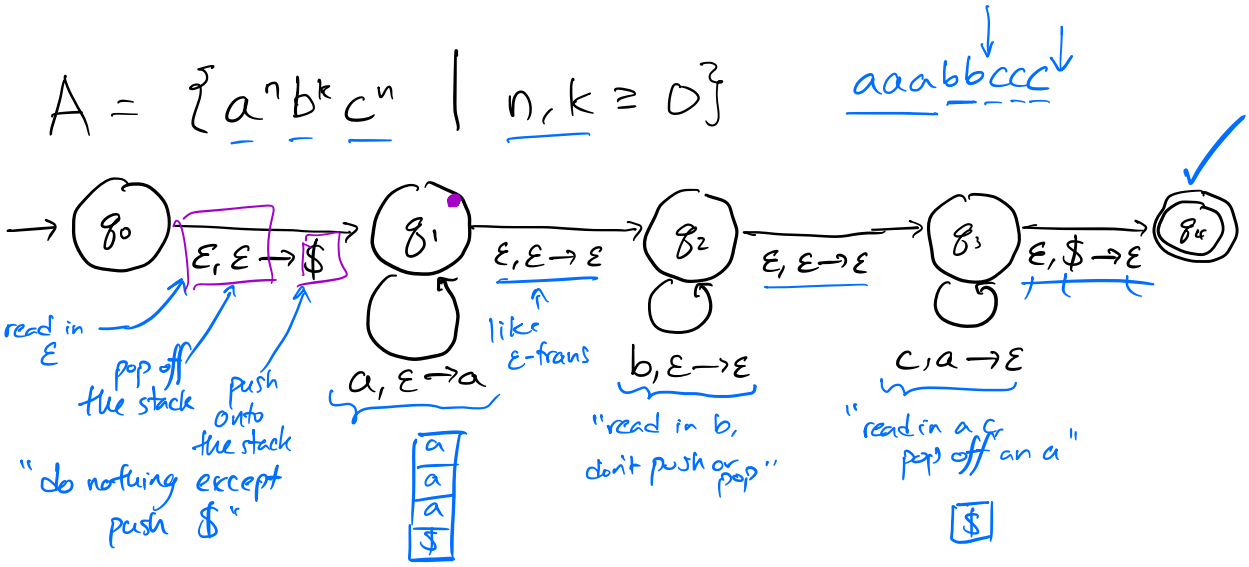
Sipser pp. 111-114

Pushdown Automaton (PDA)



1. Read in an input character
2. Pop a character off the stack
3. Move to a new state
4. Push a character onto the stack

$A = \{a^n b^k c^n \mid n, k \geq 0\}$ aaabbccc



Def. [PDA, Formal]. A Pushdown Automaton is a 6-tuple $(Q, \Sigma, \Gamma, q_0, F, \delta)$ where:

- Q is the set of states $\{q_0, q_1, q_2, q_3, q_4\}$
- Σ is the input alphabet $\{a, b, c\}$
- Γ is the stack alphabet $\{\$, a\}$ $\{\$, a, b, c\}$
- q_0 is the start state

- F is the set of accept states $\{q_4\}$

- and $\delta: Q \times \Sigma_\varepsilon \times \Gamma_\varepsilon \longrightarrow P(Q \times \Gamma_\varepsilon)$ is the transition function.

($\Sigma \cup \{\varepsilon\}$, $\Gamma \cup \{\varepsilon\}$)

"give me a state, an input symbol or ε, and a stack symbol or ε."

"go to this state and push this stack symbol"

"go to these pairs of (state, push symbol)."

$$\delta(q_1, a, \varepsilon) = \{(q_1, a), (q_6, \varepsilon)\}$$