Pushdown Automata

The pushdown automaton is in essence a nondeterministic finite automaton with ϵ-transitions permitted and one additional capability: a stack on which it can store a string of "stack symbols." The presence of a stack means that, unlike the finite automaton, the pushdown automaton can "remember" an infinite amount of information. However, unlike a general-purpose computer, which also has the ability to remember arbitrarily large amounts of information, the pushdown automaton can only access the information on its stack in a last-in-first-out way.

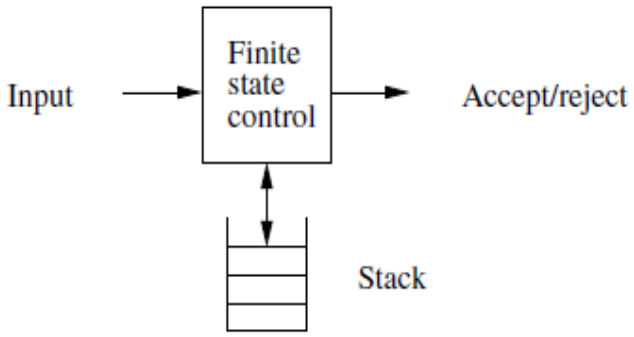

Figure 6.1: A pushdown automaton is essentially a finite automaton with a stack data structure

We can view the pushdown automaton informally as the device suggested in Fig. 6.1. A "finite-state control" reads inputs, one symbol at a time. The pushdown automaton is allowed to observe the symbol at the top of the stack and to base its transition on its current state, the input symbol, and the symbol at the top of stack.