The Theory of Computation

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Addison-Wesley-Longman, 1998

Solution Manual
Chapter 3, Problem 3.1

Flipping the labels assigned to the states in order to complement the language accepted by a finite automaton works in all cases—at least, all cases within the range of behavior seen so far. Each input string takes the automaton through a well defined sequence of states; that sequence does not depend on the accepting/rejecting labels assigned to the states. If there is a unique sequence corresponding to each string, then flipping the labels does what we want: every sequence that was an accepting sequence becomes a rejecting one (and thus every string in the original language gets rejected) and every sequence that was a rejecting sequence becomes an accepting one (and thus every string not in the original language gets accepted). Problems can only arise when there are several possible sequences for a given input strings, with some accepting and some rejecting—a configuration that belongs to nondeterministic automata.