

Theory of Automata – Home Work 3

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1. Draw a state diagram for nondeterministic finite automata that accepts the following languages

1.1 $((ab)^*(ba)^*) \cup aa^*$

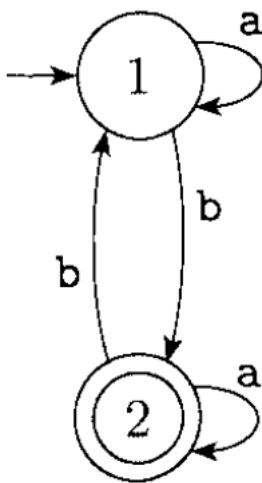
Sol : The easiest way to do this is to make a 2 state FSA for aa^* and a 4 state one for $(ab)^*(ba)^*$, then make a seventh state, the start state, that non-deterministically guesses which class an input string will fall into.

1.2. $(ba \cup b)^* \cup (bb \cup a)^*$

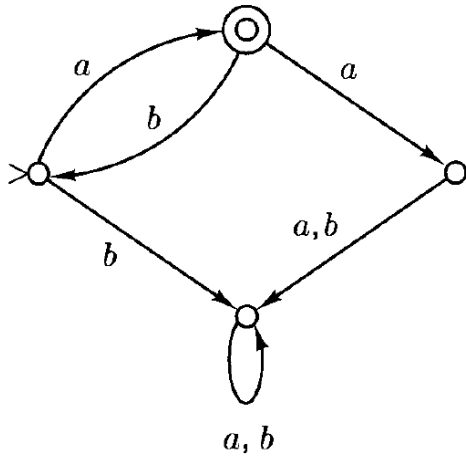
Sol: This is the set of strings where either:

- (1) every a is preceded by a b, or
- (2) all b's occur in pairs. So, we can make a 5 state nondeterministic machine by making separate machines (each with two states) for the two languages and then introducing ϵ transitions from the start state to both of them.

2. Give the regular expression for the language accepted by the following finite automaton



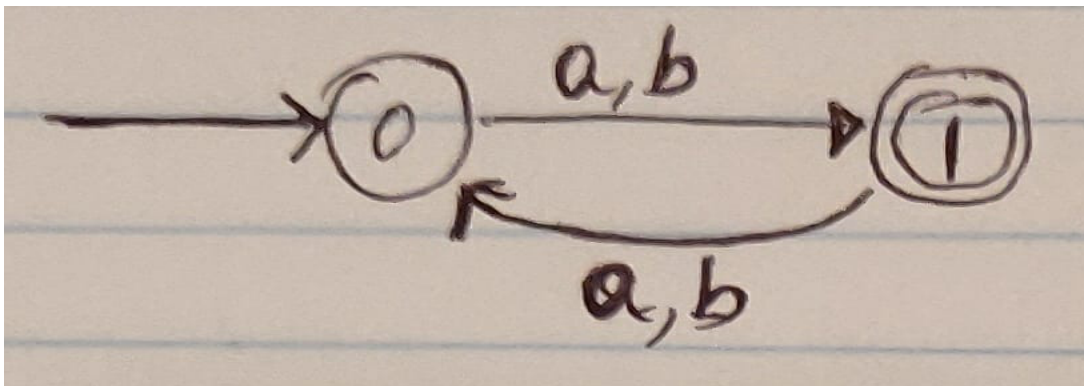
Sol: $a^* (ba^* ba^*)^*$



Sol: $abb(ab)^*$

3. Write the regular expression for the following sets

3.1 All strings over $\{a, b\}$ that are odd in length



3.2 All strings over $\{a, b\}$ that end with bb

