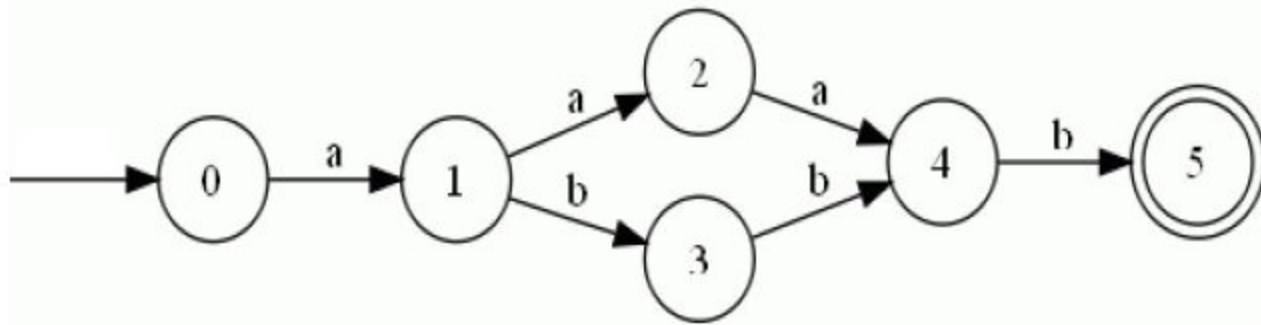


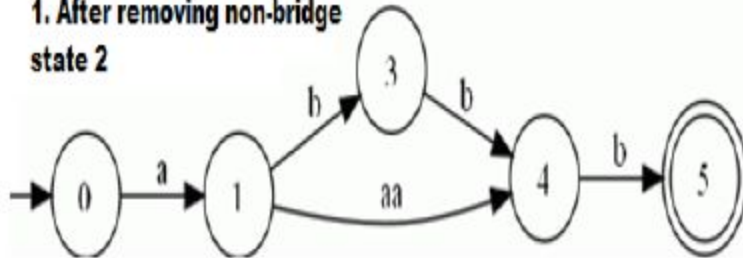
Regular Expression

DFA to RE

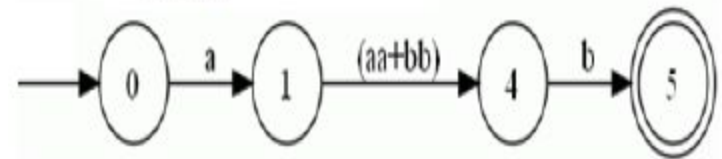


DFA to RE

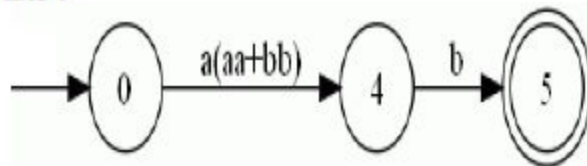
1. After removing non-bridge state 2



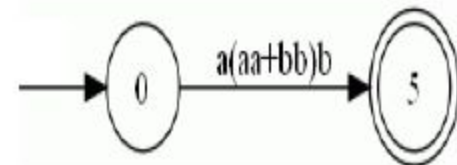
2. After removing non-bridge state 3



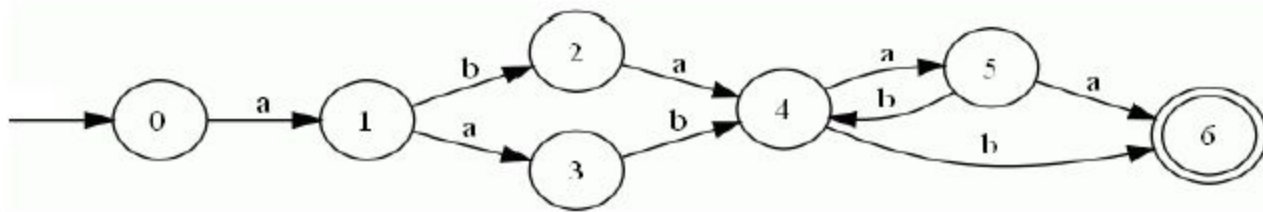
3. After removing bridge state 1



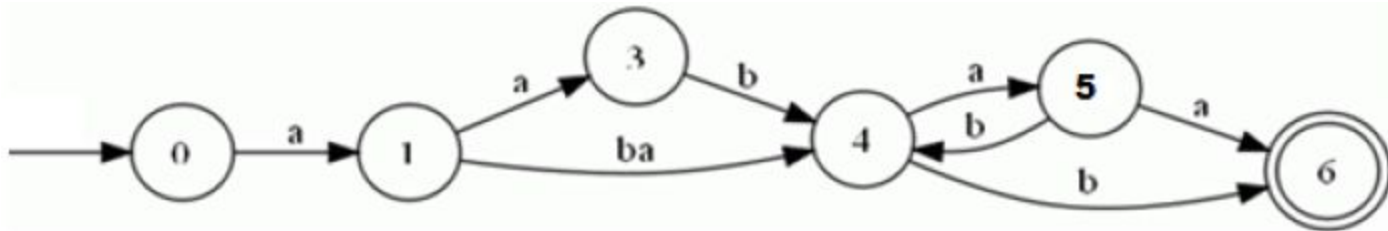
4. After removing bridge state 4



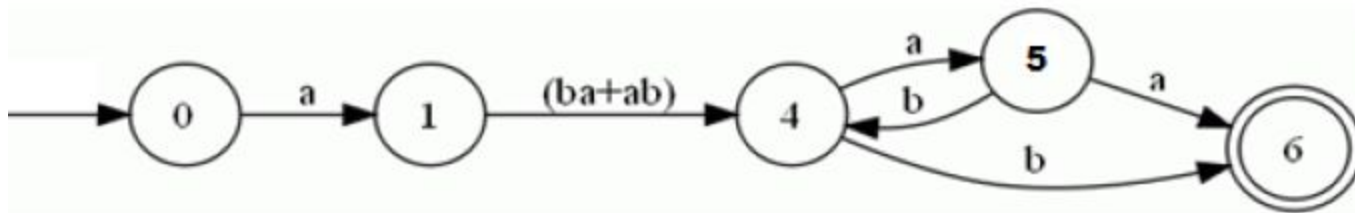
DFA to RE



DFA to RE

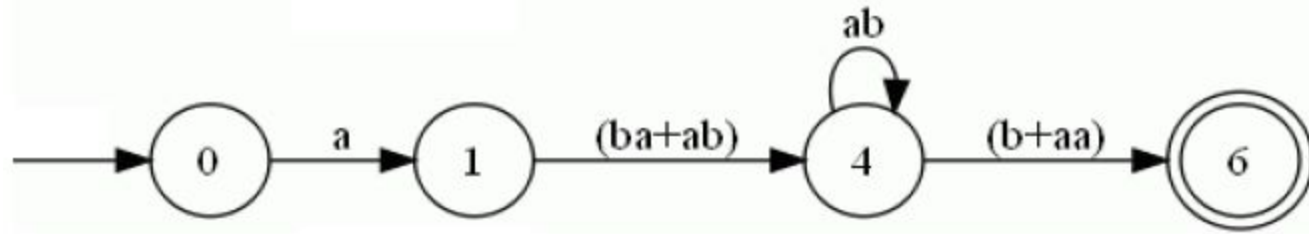


DFA after removing state 2

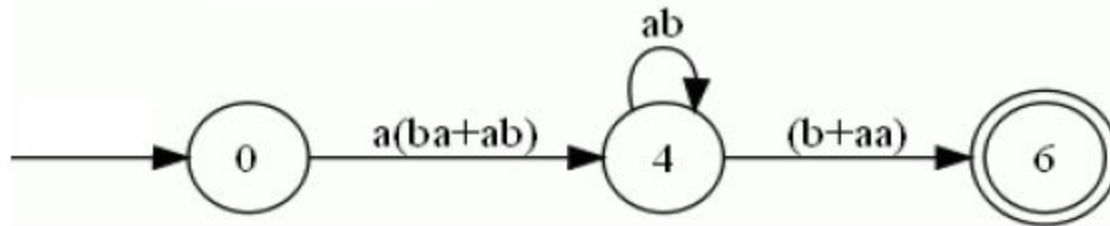


DFA after removing state 3

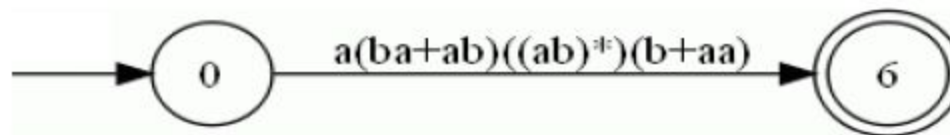
DFA to RE



DFA after removing state 5



DFA after removing state 1



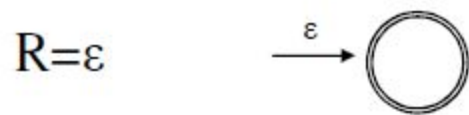
DFA after removing state 4

RE to Automata

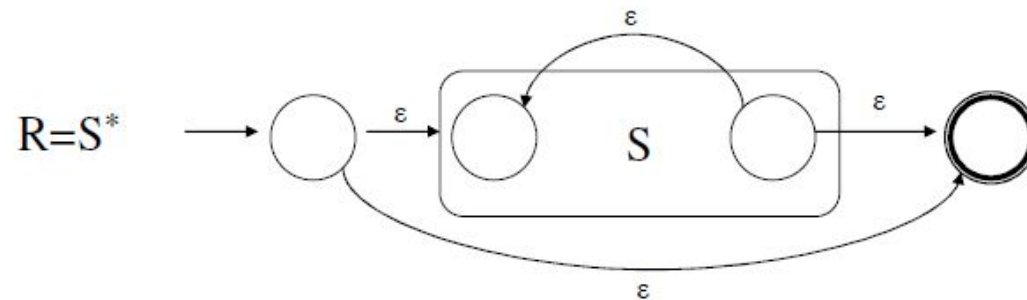
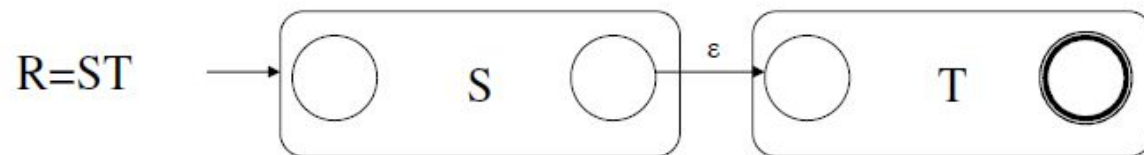
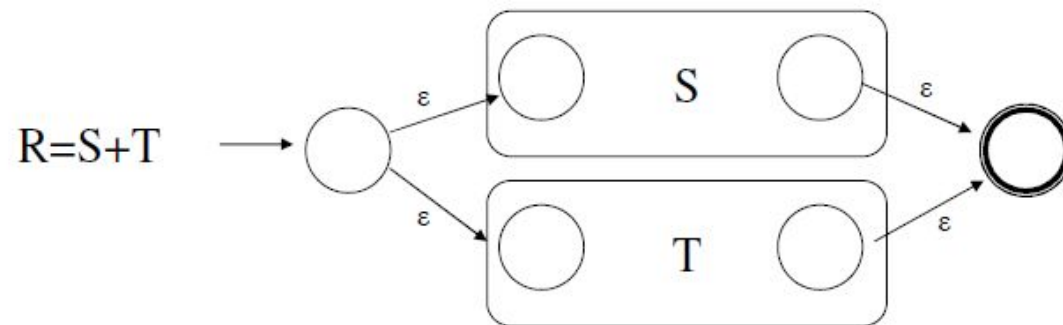
- We have shown we can convert an automata to a RE. To show equivalence we must also go the other direction, convert a RE to an automaton.
- We can do this easiest by converting a RE to an ϵ -NFA
 - Inductive construction
 - Start with a simple basis, use that to build more complex parts of the NFA

RE to Automata

- Basis:

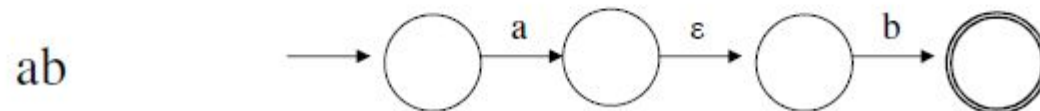
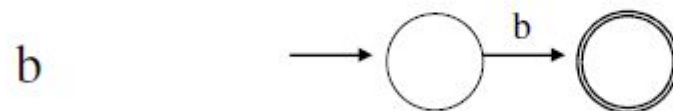
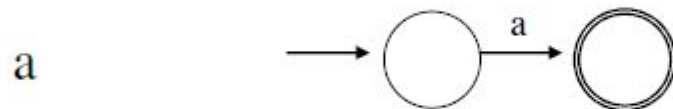


RE to Automata



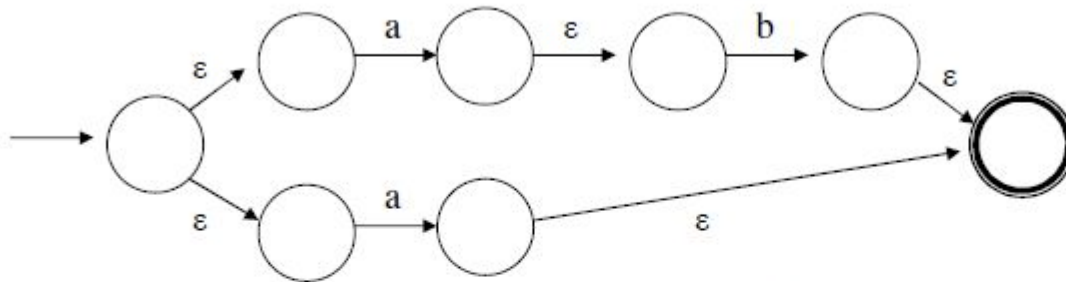
RE to Automata

- Convert $R = (ab+a)^*$ to an NFA
 - We proceed in stages, starting from simple elements and working our way up

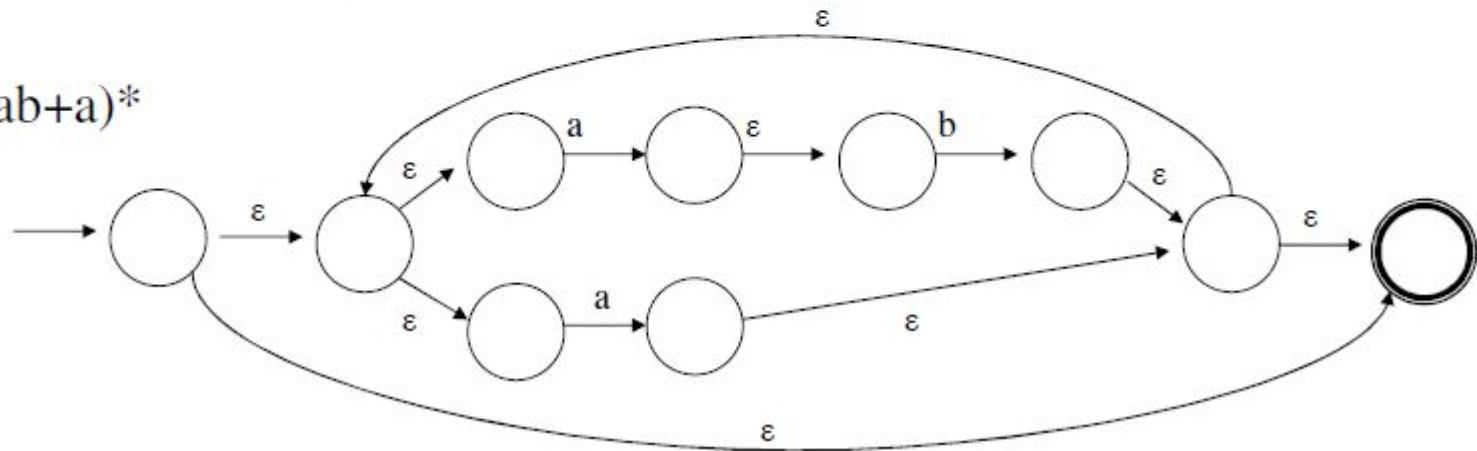


RE to Automata

$ab+a$



$(ab+a)^*$



RE to Automata

- Another approach
 - Mishra