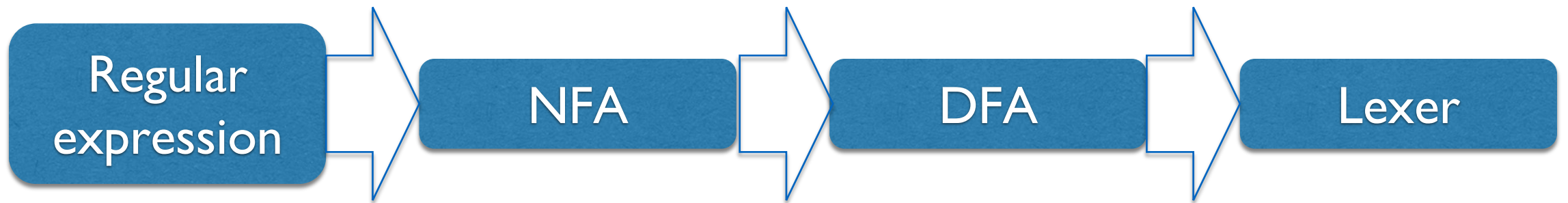


Minimization

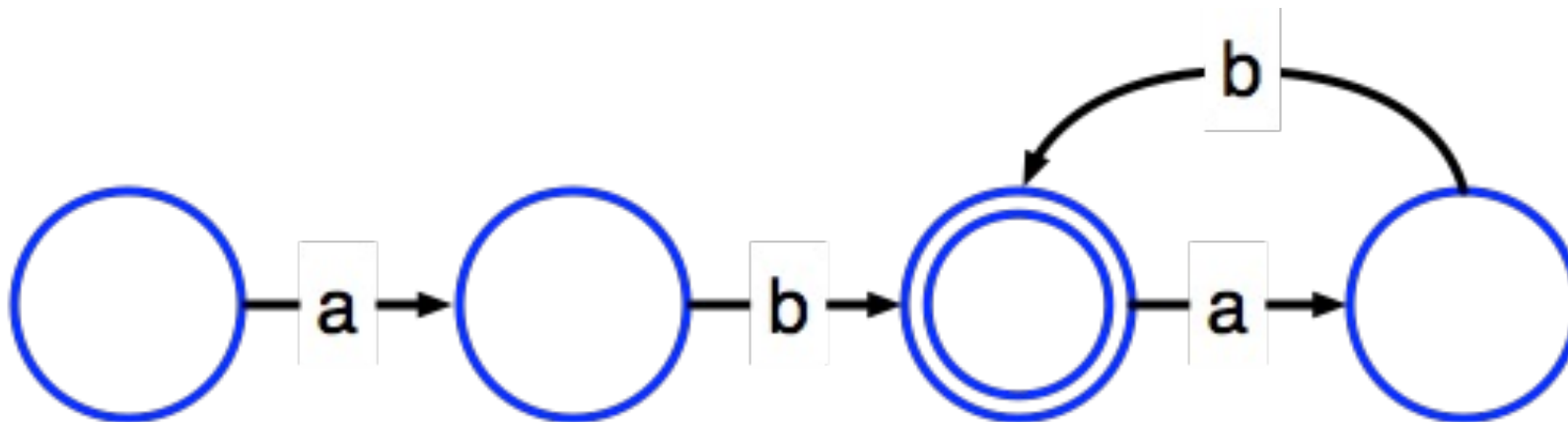
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DFA reduction

- **Theorem:** there is a unique optimal DFA.
- DFA built from NFA are not necessarily optimal
- May contain many more states than is necessary

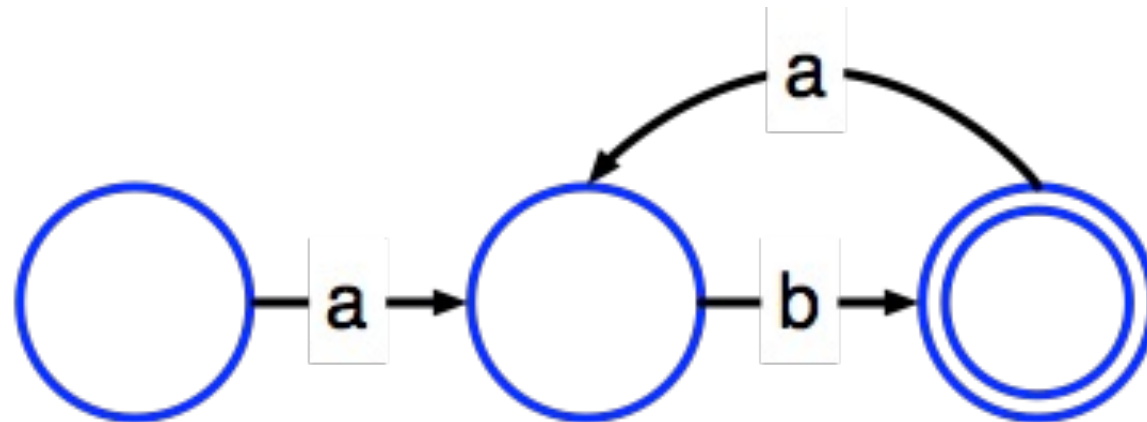
$$(ab)^+ \equiv (ab)(ab)^*$$



DFA reduction

- DFAs built from NFAs are not necessarily optimal
- May contain many more states than is necessary

$$(ab)^+ \equiv (ab)(ab)^*$$



DFA reduction

- Intuition: merge equivalent states
 - Two states are equivalent if they have the same transitions to the same states
- Basic idea of optimization algorithm
 - Start with two big blocks, one representing all the (reachable) final states, the other representing all other (reachable) states
 - Successively partition those blocks if the internal states are mutually equivalent, i.e., some transitions lead to different blocks

Example

- Simplify the following

