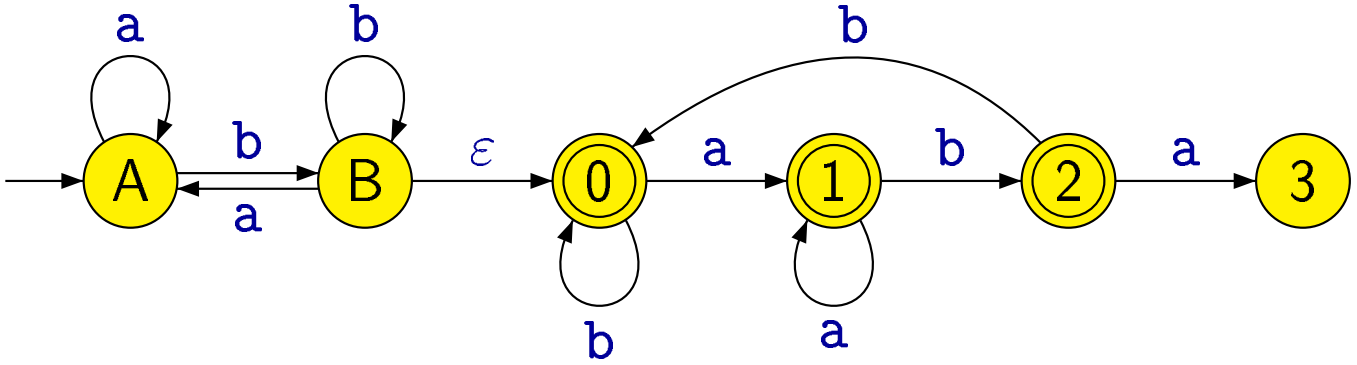
Zobecněný nedeterministický konečný automat

Definice

(Zobecněný) nedeterministický konečný automat je uspořádaná pětice $\mathcal{A} = (Q, \Sigma, \delta, I, F)$, kde

- Q je konečná neprázdná množina stavů
- Σ je konečná neprázdná množina zvaná vstupní abeceda
- $\delta : Q \times (\Sigma \cup \{\varepsilon\}) \to 2^Q$ je (nedeterministická) přechodová funkce
- $I \subseteq Q$ je neprázdná množina počátečních stavů
- $F \subseteq Q$ je množina přijímajících (koncových) stavů

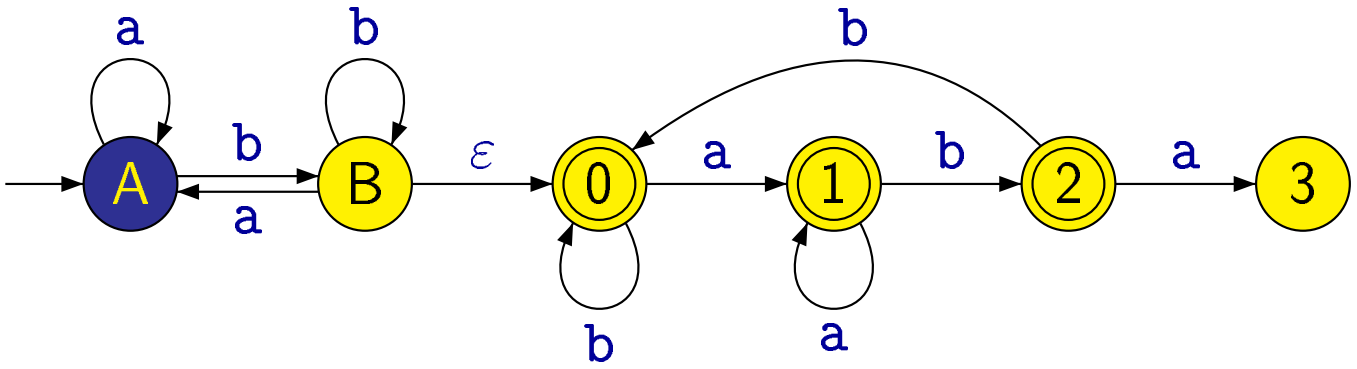
Zobecněný nedeterministický konečný automat

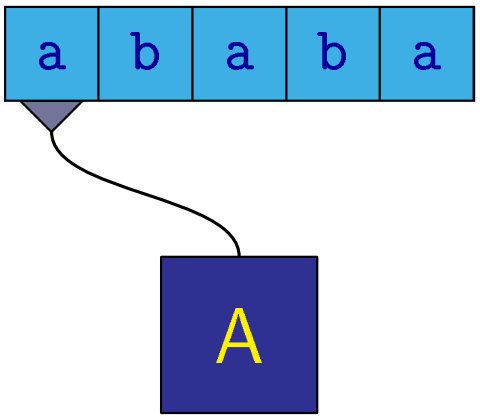


- $Q = \{A, B, 1, 2, 3\}$
- $\Sigma = \{\mathtt{a}, \mathtt{b}\}$
- $I = \{A\}$
- $F = \{0, 1, 2\}$

$$\delta(A, \mathtt{a}) = \{A\} \qquad \delta(A, \mathtt{b}) = \{B\}$$
$$\delta(B, \mathtt{a}) = \{A\} \qquad \delta(B, \mathtt{b}) = \{B\}$$
$$\delta(B, \varepsilon) = \{0\}$$
$$\delta(0, \mathtt{a}) = \{1\} \qquad \delta(0, \mathtt{b}) = \{0\}$$
$$\delta(1, \mathtt{a}) = \{1\} \qquad \delta(1, \mathtt{b}) = \{2\}$$
$$\delta(2, \mathtt{a}) = \{3\} \qquad \delta(2, \mathtt{b}) = \{0\}$$
$$\delta(3, \mathtt{a}) = \emptyset \qquad \delta(3, \mathtt{b}) = \emptyset$$

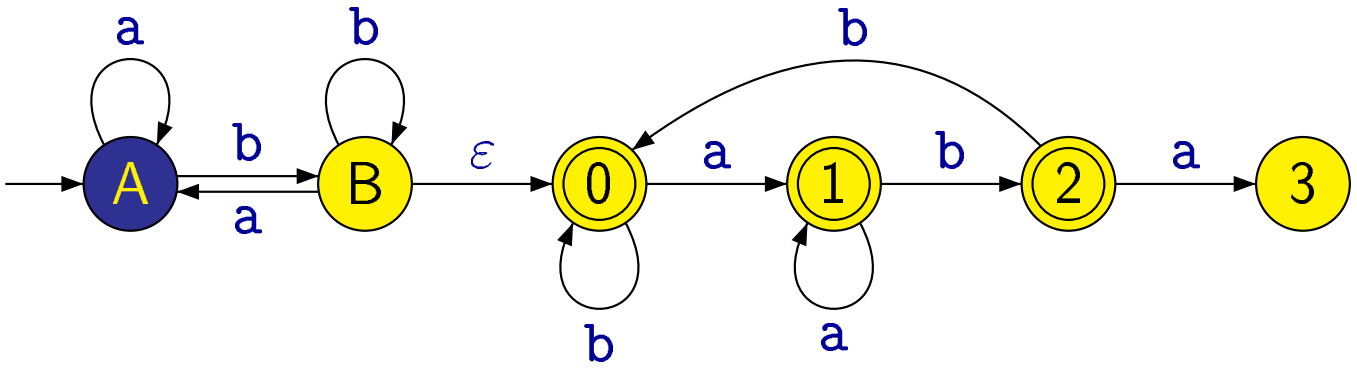
Zobecněný nedeterministický konečný automat

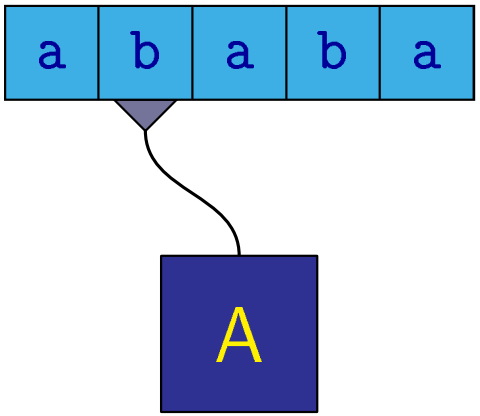




$(A, \mathtt{ababa})$

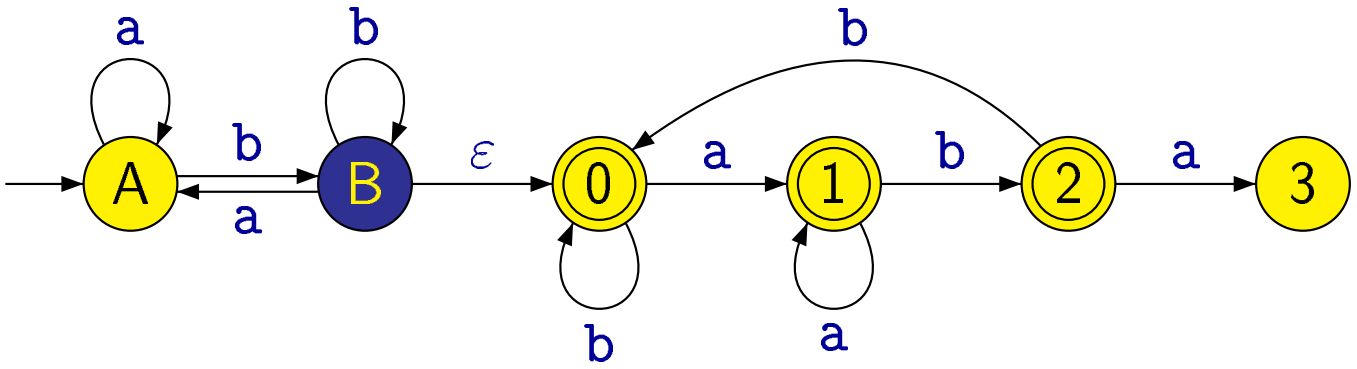
Zobecněný nedeterministický konečný automat

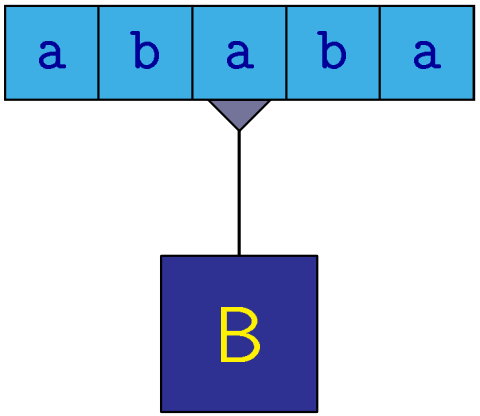




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba})$

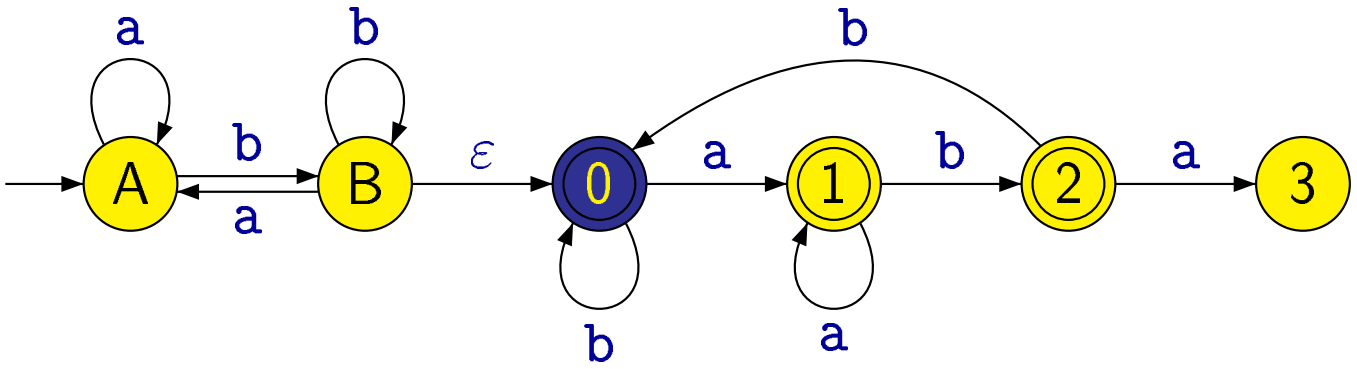
Zobecněný nedeterministický konečný automat

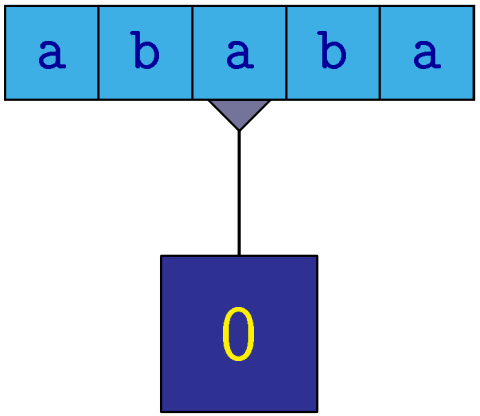




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash (B, \mathtt{aba})$

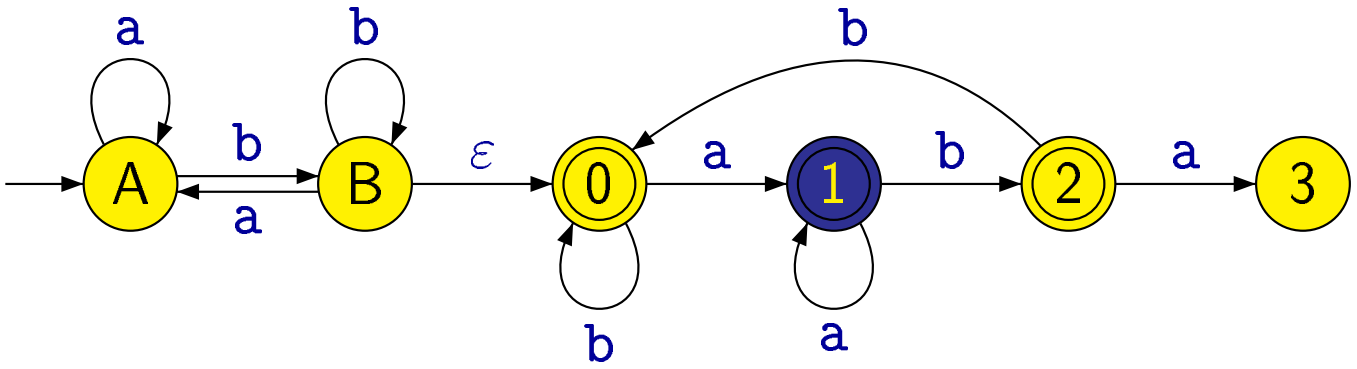
Zobecněný nedeterministický konečný automat

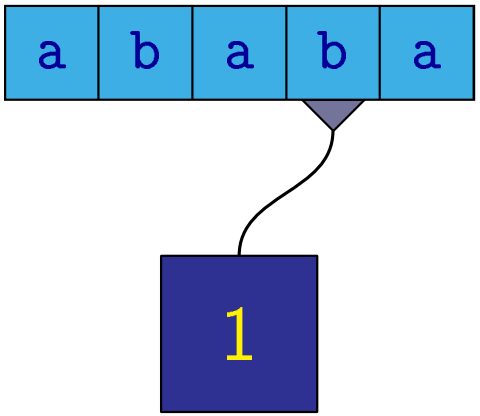




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (0, \mathtt{aba})$

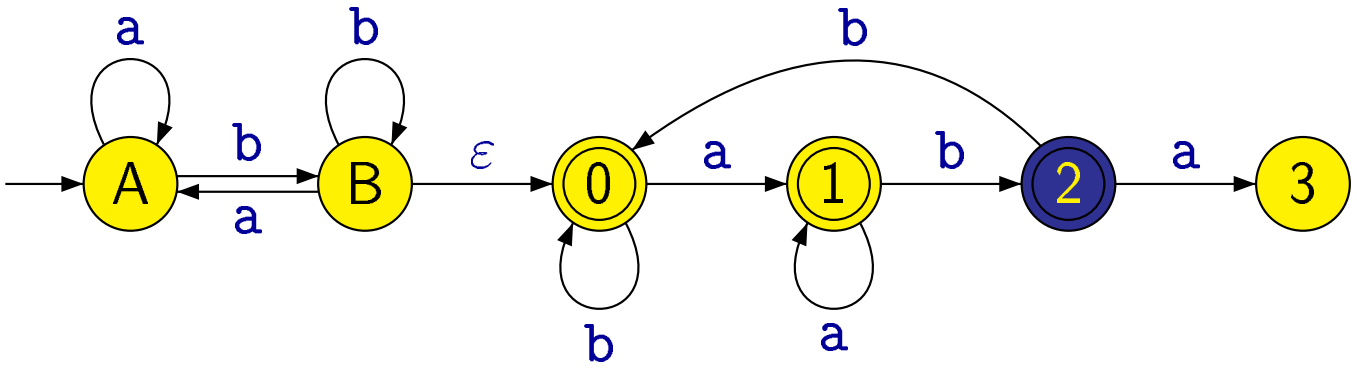
Zobecněný nedeterministický konečný automat

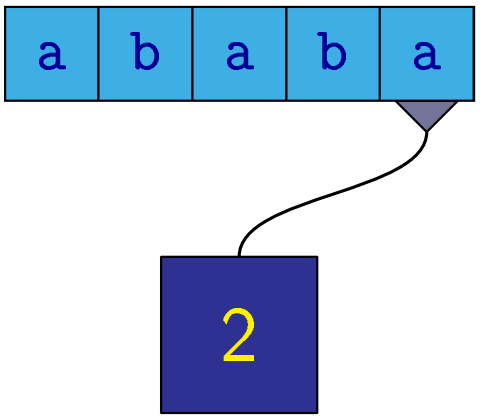




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (0, \mathtt{aba}) \vdash$
$(1, \mathtt{ba})$

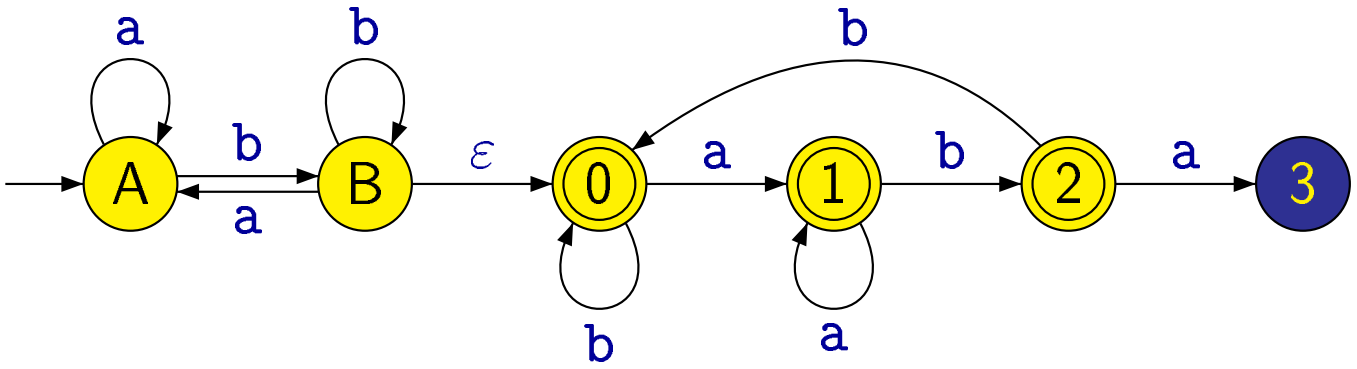
Zobecněný nedeterministický konečný automat

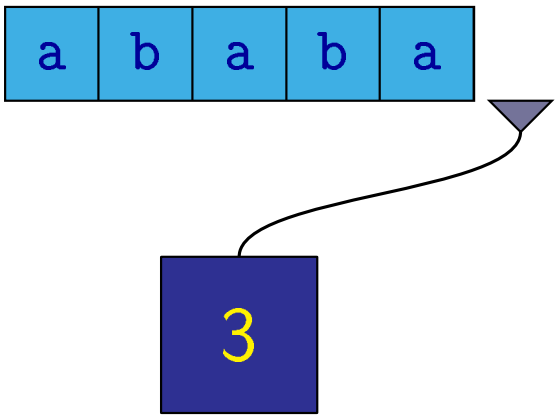




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (0, \mathtt{aba}) \vdash$
$(1, \mathtt{ba}) \vdash (2, \mathtt{a})$

Zobecněný nedeterministický konečný automat

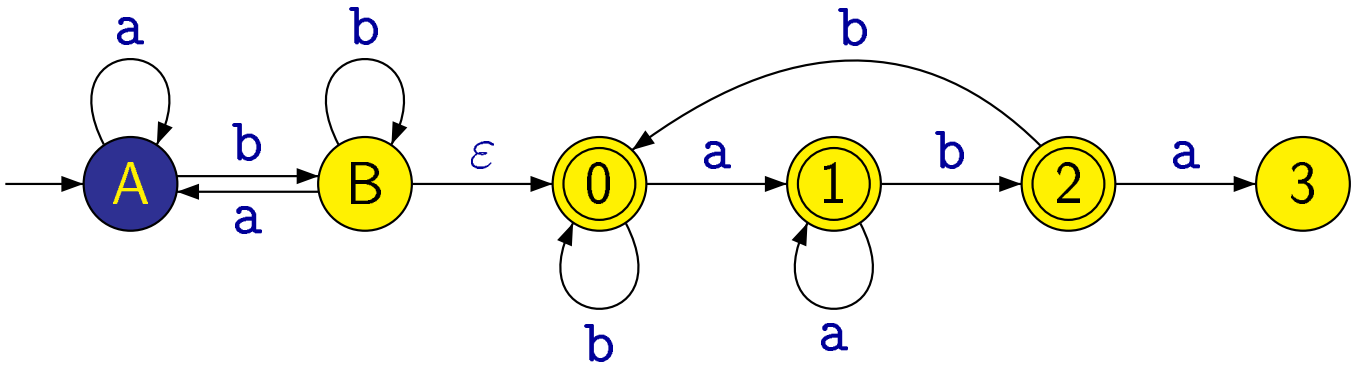


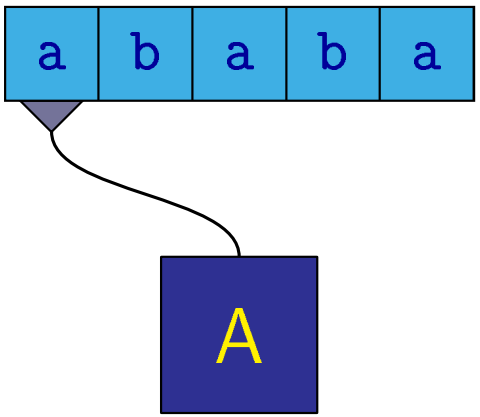


$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (0, \mathtt{aba}) \vdash$
$(1, \mathtt{ba}) \vdash (2, \mathtt{a}) \vdash (3, \varepsilon)$

Úplný, ale nepřijímající výpočet

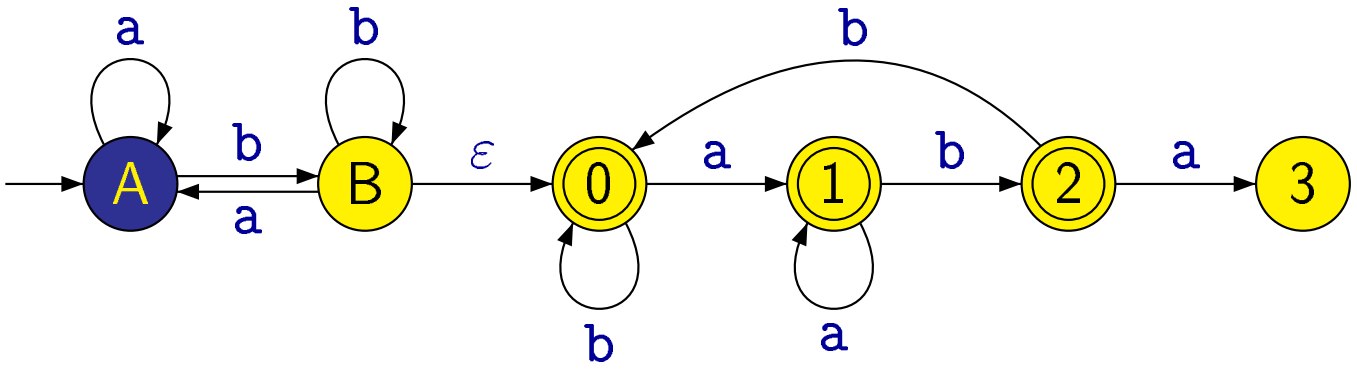
Zobecněný nedeterministický konečný automat

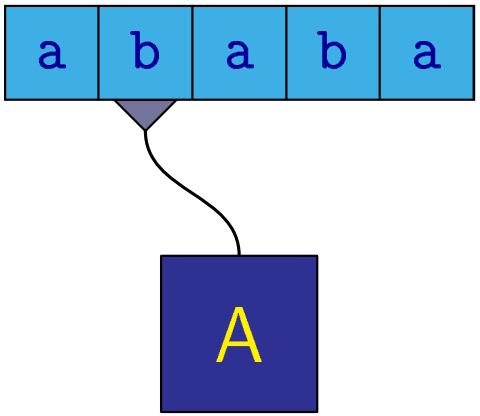




$(A, \mathtt{ababa})$

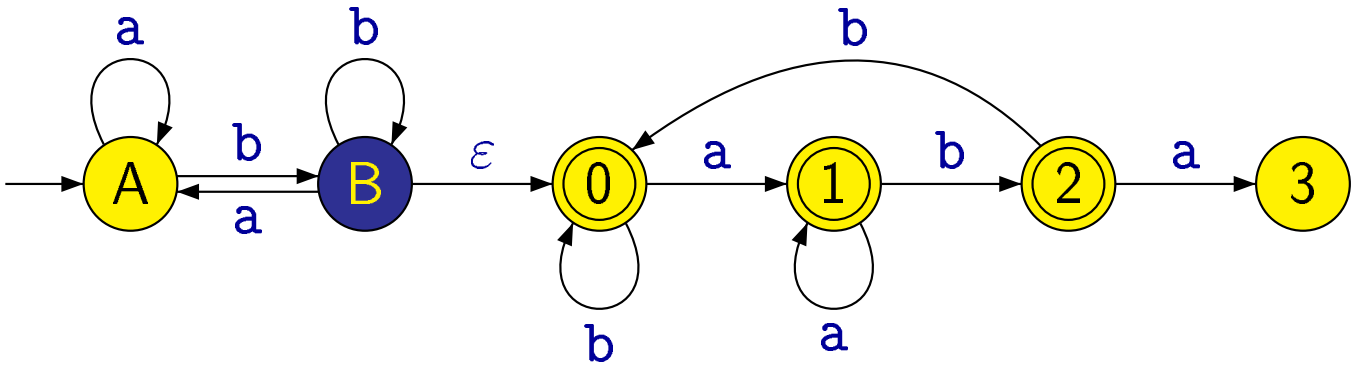
Zobecněný nedeterministický konečný automat

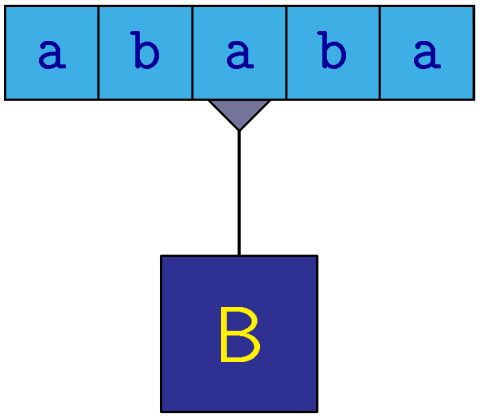




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba})$

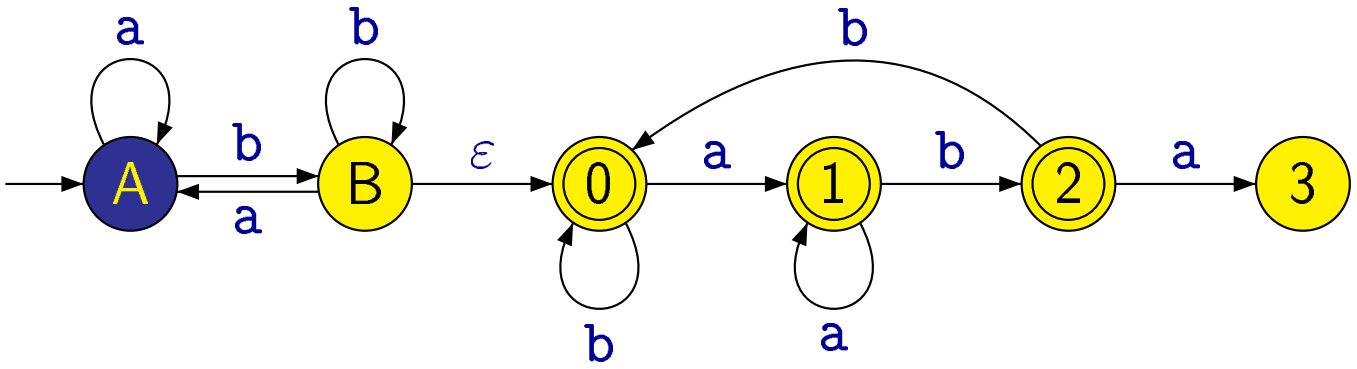
Zobecněný nedeterministický konečný automat

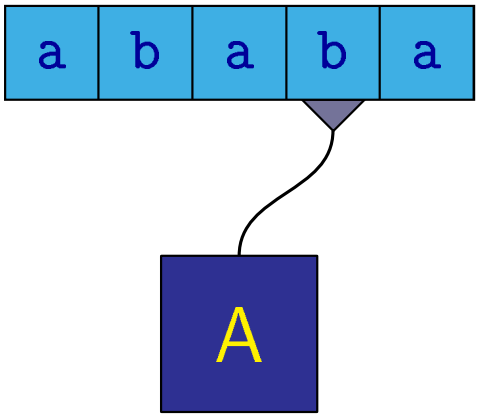




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash (B, \mathtt{aba})$

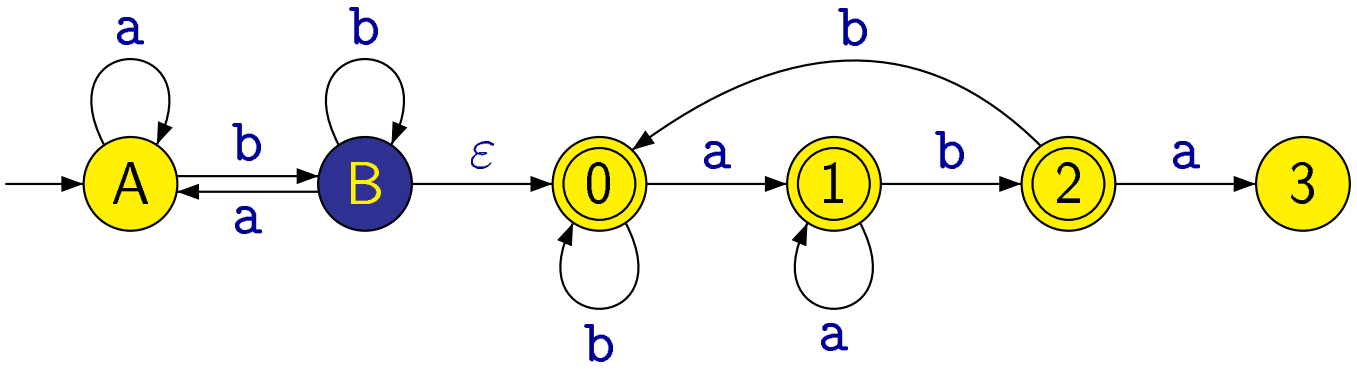
Zobecněný nedeterministický konečný automat

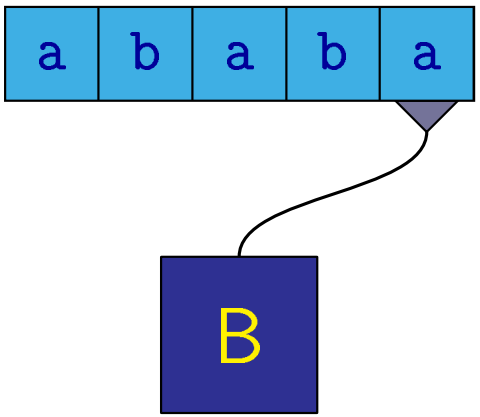




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (A, \mathtt{ba})$

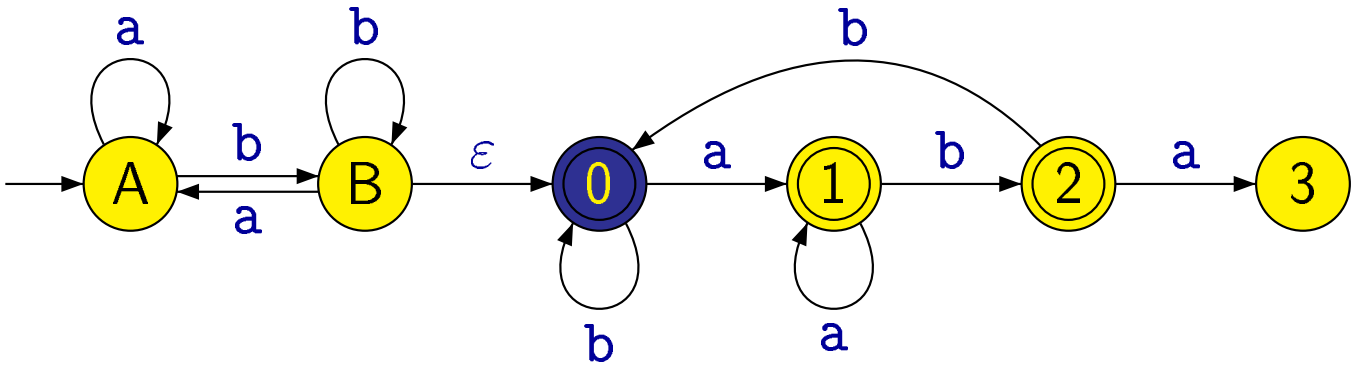
Zobecněný nedeterministický konečný automat

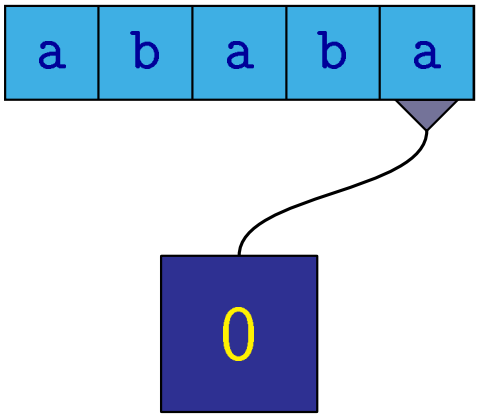




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (A, \mathtt{ba}) \vdash$
$(B, \mathtt{a})$

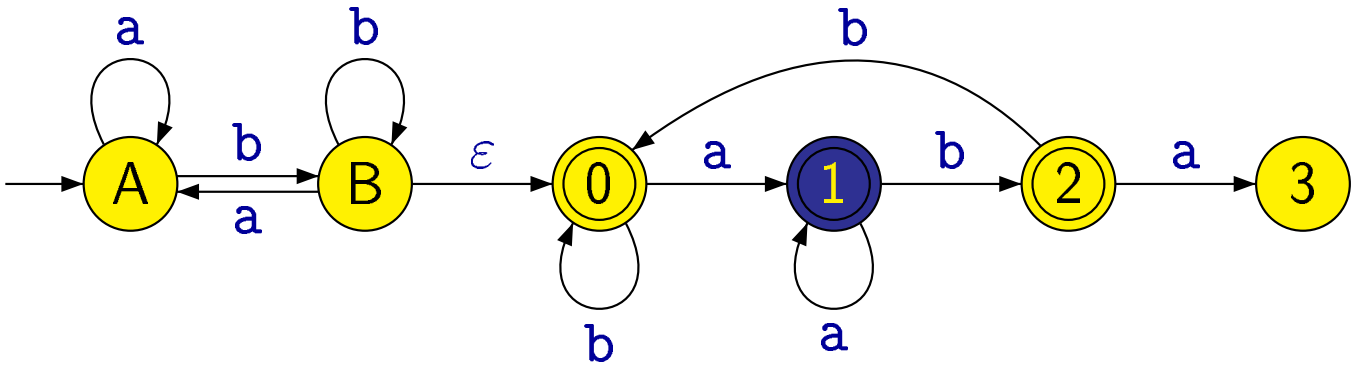
Zobecněný nedeterministický konečný automat

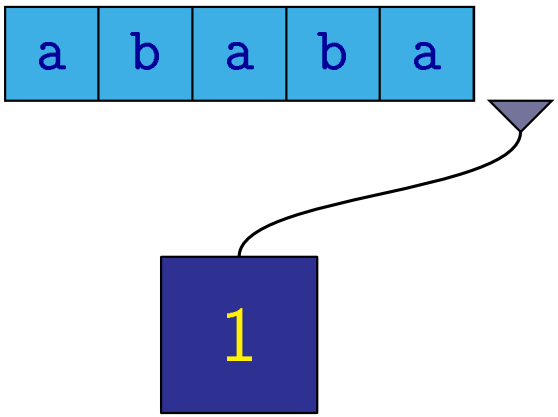




$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (A, \mathtt{ba}) \vdash$
$(B, \mathtt{a}) \vdash (0, \mathtt{a})$

Zobecněný nedeterministický konečný automat

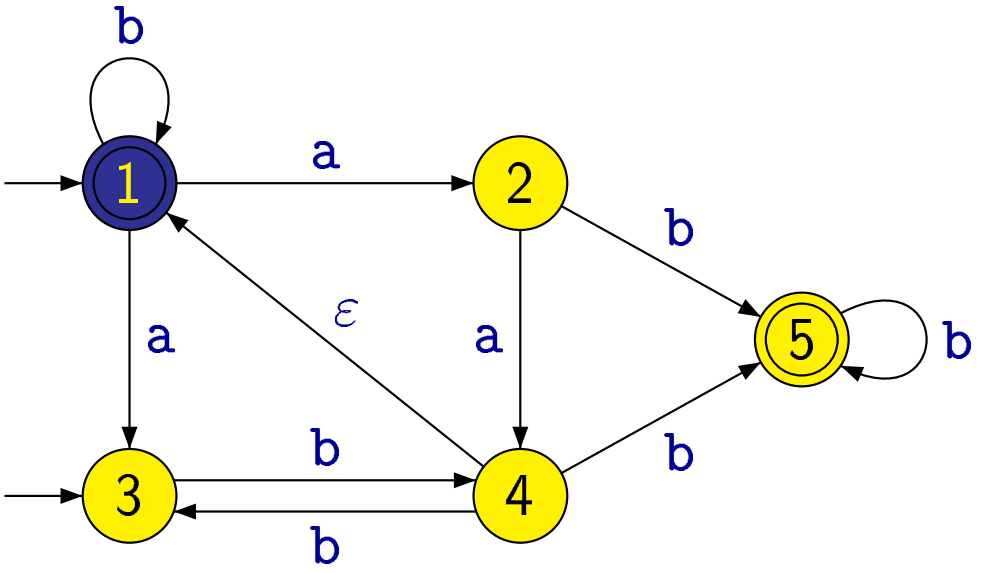




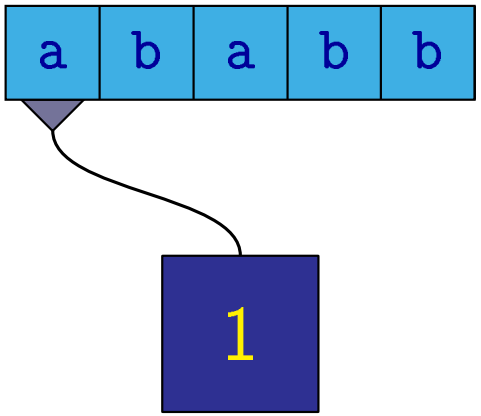
$(A, \mathtt{ababa}) \vdash (A, \mathtt{baba}) \vdash$
$(B, \mathtt{aba}) \vdash (A, \mathtt{ba}) \vdash$
$(B, \mathtt{a}) \vdash (0, \mathtt{a}) \vdash (3, \varepsilon)$

Úplný přijímající výpočet

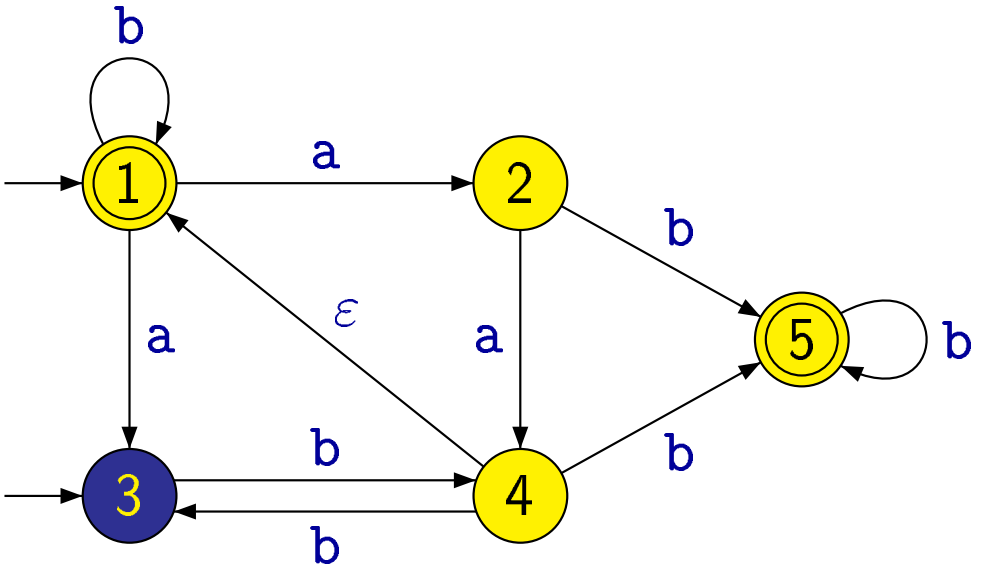
Zobecněný nedeterministický konečný automat

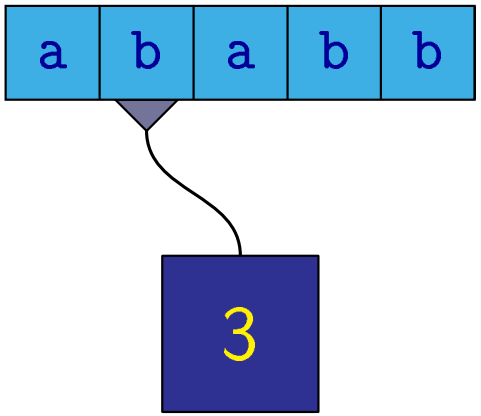


$(1, \mathtt{ababb})$



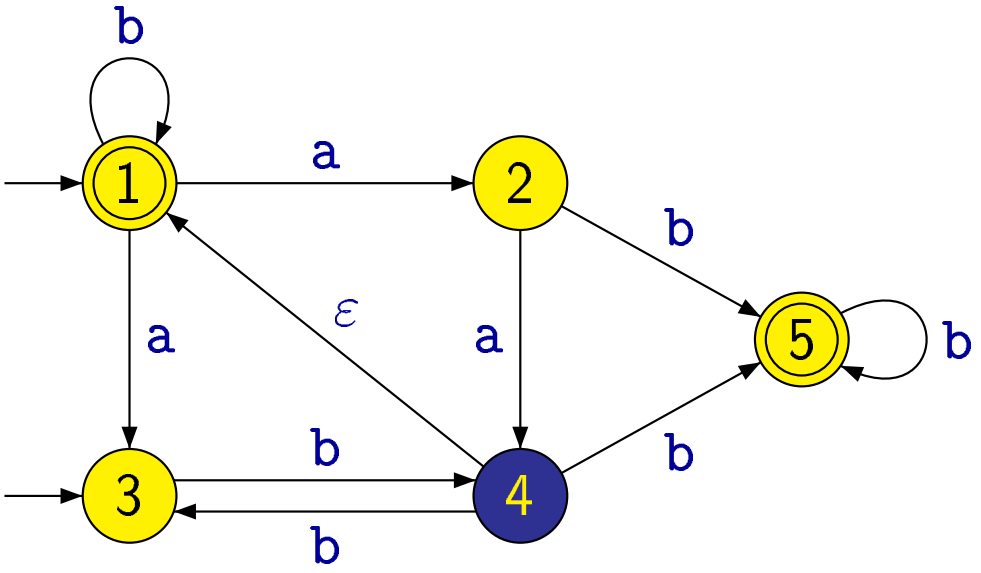
Zobecněný nedeterministický konečný automat

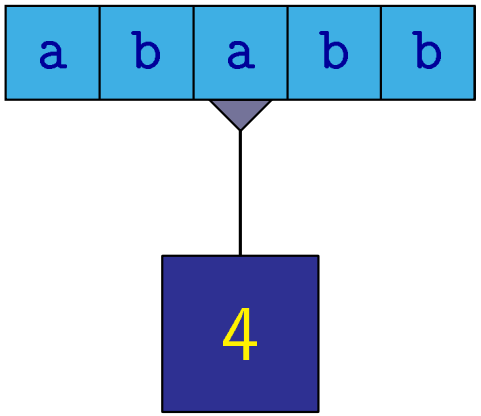




$(1, \mathtt{ababb})$
$\vdash (3, \mathtt{babb})$

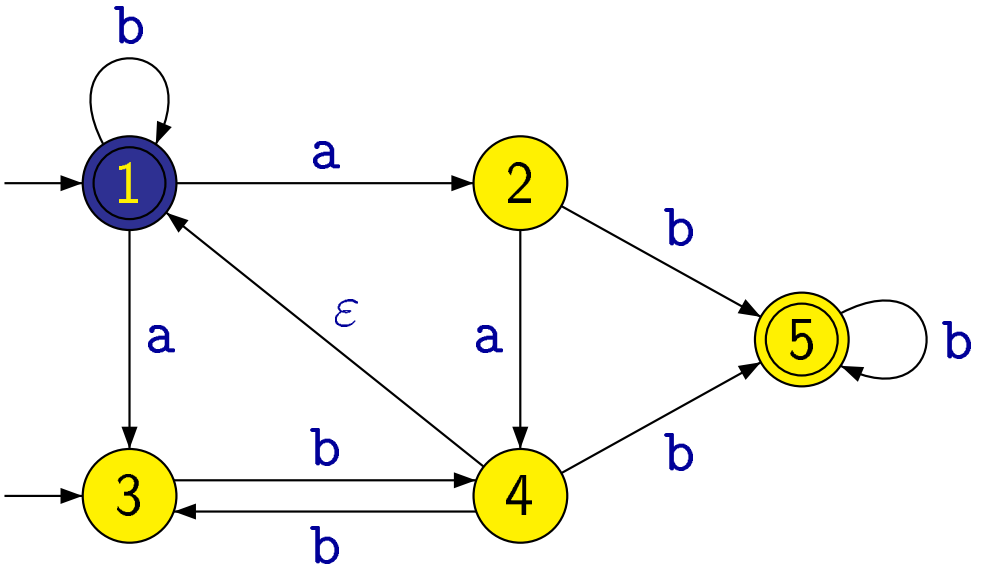
Zobecněný nedeterministický konečný automat

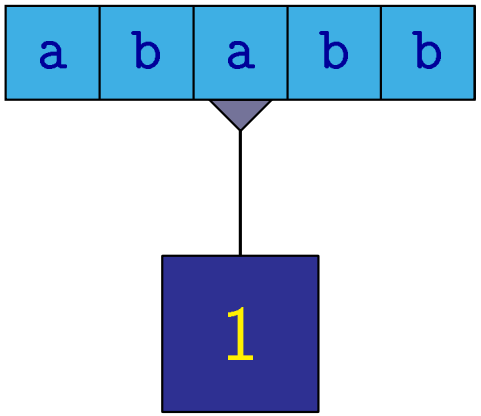




$(1, \mathtt{ababb})$
$\vdash (3, \mathtt{babb})$
$\vdash (4, \mathtt{abb})$

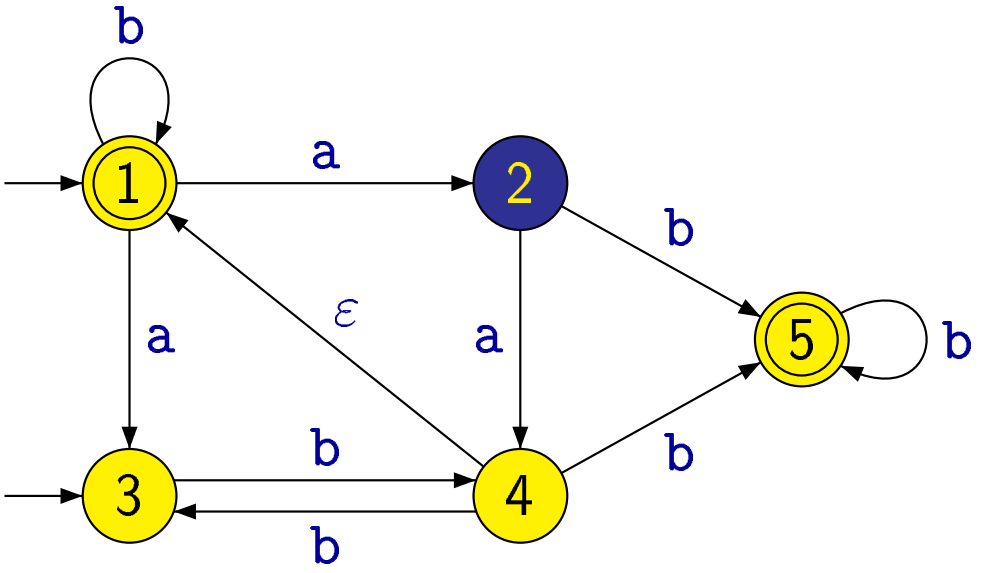
Zobecněný nedeterministický konečný automat

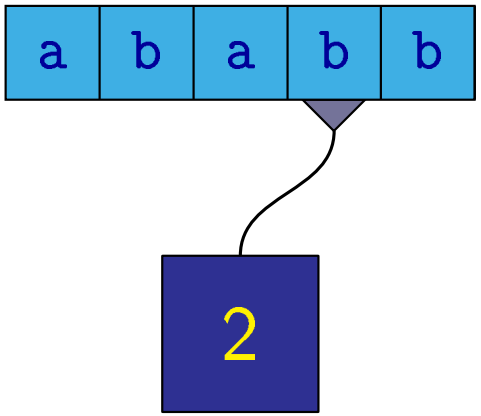




$(1, \mathtt{ababb})$
$\vdash (3, \mathtt{babb})$
$\vdash (4, \mathtt{abb})$
$\vdash (1, \mathtt{abb})$

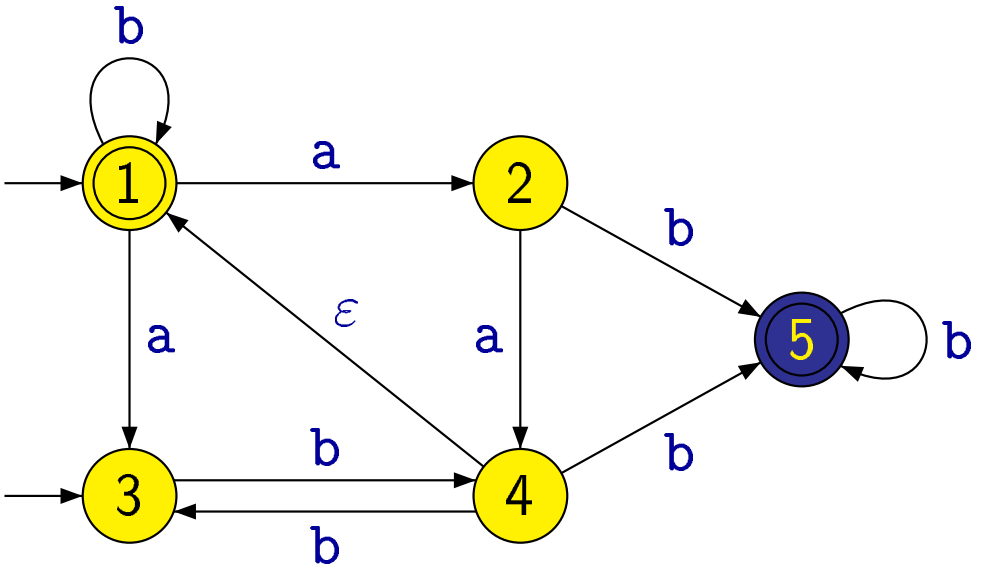
Zobecněný nedeterministický konečný automat

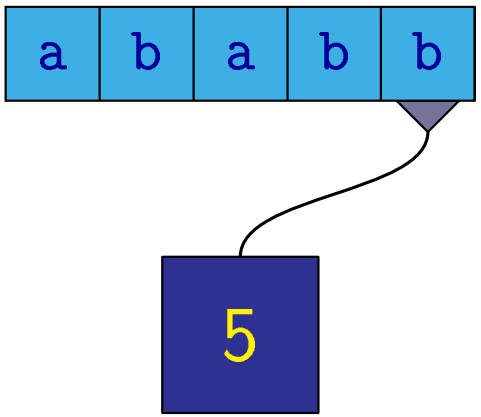




$(1, \mathtt{ababb})$
$\vdash (3, \mathtt{babb})$
$\vdash (4, \mathtt{abb})$
$\vdash (1, \mathtt{abb})$
$\vdash (2, \mathtt{bb})$

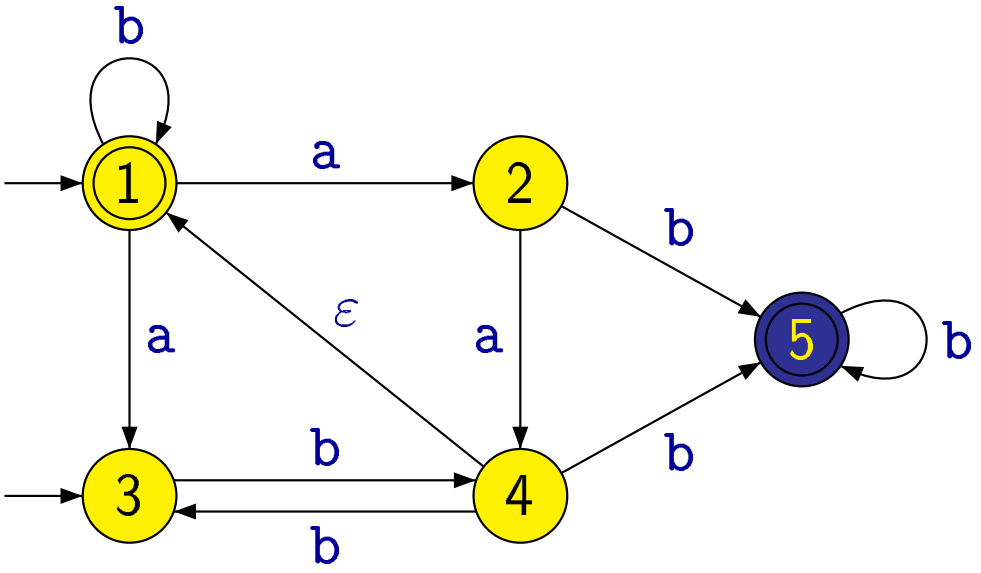
Zobecněný nedeterministický konečný automat

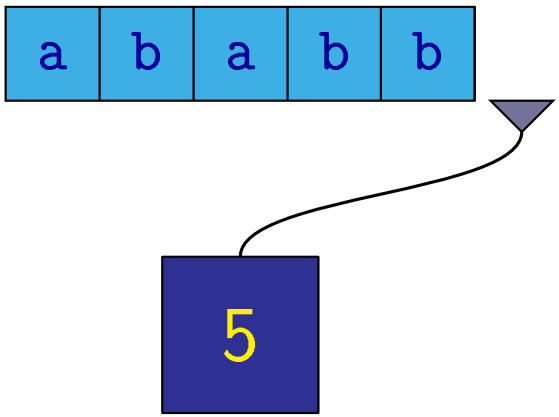




$(1, \mathtt{ababb})$
$\vdash (3, \mathtt{babb})$
$\vdash (4, \mathtt{abb})$
$\vdash (1, \mathtt{abb})$
$\vdash (2, \mathtt{bb})$
$\vdash (5, \mathtt{b})$

Zobecněný nedeterministický konečný automat





$(1, \mathtt{ababb})$
$\vdash (3, \mathtt{babb})$
$\vdash (4, \mathtt{abb})$
$\vdash (1, \mathtt{abb})$
$\vdash (2, \mathtt{bb})$
$\vdash (5, \mathtt{b})$
$\vdash (5, \varepsilon)$