Automata on Infinite Structure
Fall 2018

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Exercice Sheet 6

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## Exercise 1

$$\begin{aligned}
\hat{\delta}(\{q_0\}, a) &= \{q_0, q_1\} \\
i'_0((\{q_0\}), a) &= (\{q_0, q_1\}) \\
i'_1((\{q_0, q_1\})) &= (\{q_0, q_1\}) \\
i'_2((\{q_0, q_1\})) &= (\{q_0\}, \{q_1\}) \\
i'_3((\{q_0\}, \{q_1\})) &= (\{q_0\}, \{q_1\})
\end{aligned}$$

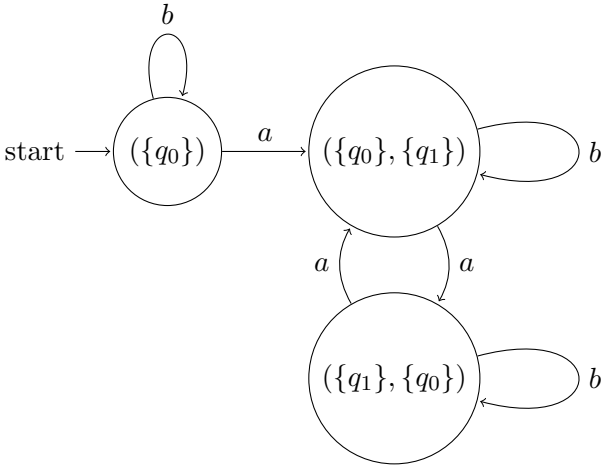
$$\begin{aligned}
\hat{\delta}(\{q_0\}, b) &= \{q_0\} \\
i'_0((\{q_0\}), a) &= (\{q_0\}) \\
i'_1((\{q_0\})) &= (\{q_0\}) \\
i'_2((\{q_0\})) &= (\{q_0\}, \emptyset) \\
i'_3((\{q_0\}, \emptyset)) &= (\{q_0\})
\end{aligned}$$

$$\begin{aligned}
\hat{\delta}(\{q_0, q_1\}, a) = \hat{\delta}(\{q_0, q_1\}, b) &= \{q_0, q_1\} \\
i'_0((\{q_0, q_1\}), a) &= (\{q_0, q_1\}, \{q_0\}) \\
i'_1((\{q_0, q_1\}, \{q_0\})) &= (\{q_1\}, \{q_0\}) \\
i'_2((\{q_1\}, \{q_0\})) &= (\emptyset, \{q_1\}, \{q_0\}, \emptyset) \\
i'_3((\emptyset, \{q_1\}, \{q_0\}, \emptyset)) &= (\{q_1\}, \{q_0\})
\end{aligned}$$

$$\begin{aligned}
i'_0((\{q_0, q_1\}), b) &= (\{q_0\}, \{q_1\}) \\
i'_1((\{q_0\}, \{q_1\})) &= (\{q_0\}, \{q_1\}) \\
i'_2((\{q_0\}, \{q_1\})) &= (\{q_0\}, \emptyset, \emptyset, \{q_1\}) \\
i'_3((\{q_0\}, \emptyset, \emptyset, \{q_1\})) &= (\{q_0\}, \{q_1\})
\end{aligned}$$

$$
\begin{aligned}
i'_0((\{q_1\},\{q_0\}),a) &= (\{q_0\},\{q_0,q_1\}) \\
i'_1((\{q_0\},\{q_0,q_1\})) &= (\emptyset,\{q_0,q_1\}) \\
i'_2((\emptyset,\{q_0,q_1\})) &= (\emptyset,\emptyset,\{q_0\},\{q_1\}) \\
i'_3((\emptyset,\emptyset,\{q_0\},\{q_1\})) &= (\{q_0\},\{q_1\})
\end{aligned}
$$

$$
\begin{aligned}
i'_0((\{q_1\},\{q_0\}),b) &= (\{q_1\},\{q_0\}) \\
i'_1((\{q_1\},\{q_0\})) &= (\{q_1\},\{q_0\}) \\
i'_2((\{q_1\},\{q_0\})) &= (\emptyset,\{q_1\},\{q_0\},\emptyset) \\
i'_3((\emptyset,\{q_1\},\{q_0\},\emptyset)) &= (\{q_1\},\{q_0\})
\end{aligned}
$$




## Exercise 2

$$
\begin{aligned}
i'_0((\{q_0\}),a) &= (\{q_0\}) \\
i'_1((\{q_0\})) &= (\{q_0\}) \\
i'_2((\{q_0\})) &= (\{q_0\},\emptyset) \\
i'_3((\{q_0\},\emptyset)) &= (\{q_0\})
\end{aligned}
$$

$$
\begin{aligned}
i'_0((\{q_0\}),b) &= (\{q_0,q_1\}) \\
i'_1((\{q_0,q_1\})) &= (\{q_0,q_1\}) \\
i'_2((\{q_0,q_1\})) &= (\{q_0,q_1\},\emptyset) \\
i'_3((\{q_0,q_1\},\emptyset)) &= (\{q_0,q_1\})
\end{aligned}
$$

$$
\begin{aligned}
i'_0((\{q_0, q_1\}), a) &= (\{q_0\}, \{q_0\}) \\
i'_1((\{q_0\}, \{q_0\})) &= (\{q_0\}) \\
i'_2((\{q_0\})) &= (\{q_0\}, \emptyset) \\
i'_3((\{q_0\}, \emptyset)) &= (\{q_0\})
\end{aligned}
$$

$$
\begin{aligned}
i'_0((\{q_0, q_1\}), b) &= \\
i'_1() &= \\
i'_2() &= \\
i'_3() &=
\end{aligned}
$$

$$
\begin{aligned}
i'_0(, a) &= \\
i'_1() &= \\
i'_2() &= \\
i'_3() &=
\end{aligned}
$$

$$
\begin{aligned}
i'_0(, b) &= \\
i'_1() &= \\
i'_2() &= \\
i'_3() &=
\end{aligned}
$$