

Berechnungen und Logik

Hausaufgabenserie 2

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A1

a)

$Q = \{0, 1, 2, 3\}$	$A = \{a, b, c\}$	α, δ	$q \in Q$	$a \in A$	$\delta(q, a)$	$\alpha(q, a)$
$B = \{\epsilon, a, b, c\}$	$q_I = 0$		0	a	1	a
$\iota = \epsilon$	$\omega = \epsilon$		0	b	2	b
			0	c	3	c
			1	a	1	ϵ
			1	b	2	b
			1	c	3	c
			2	a	1	a
			2	b	2	ϵ
			2	c	3	c
			3	a	1	a
			3	b	2	b
			3	c	3	ϵ

Not sure, ob wir f_M auch definieren müssen.

b)

$$f_M(abac) = \epsilon \hat{\alpha}(0, abac) \omega(\hat{\delta}(0, abac))$$

$$\begin{aligned}
&= \epsilon \hat{\alpha}(0, abac) \epsilon \\
&= \hat{\alpha}(0, abac) \\
&= \hat{\alpha}(0, aba) \alpha(\hat{\delta}(0, aba), c) \\
&= \hat{\alpha}(0, aba) \alpha(\delta(\hat{\delta}(0, ab), a), c) \\
&= \hat{\alpha}(0, aba) \alpha(\delta(\delta(\hat{\delta}(0, a), b), a), c) \\
&= \hat{\alpha}(0, aba) \alpha(\delta(\delta(\delta(\hat{\delta}(0, \epsilon), a), b), a), c) \\
&= \hat{\alpha}(0, aba) \alpha(\delta(\delta(\delta(0, a), b), a), c) \\
&= \hat{\alpha}(0, aba) \alpha(\delta(\delta(1, b), a), c) \\
&= \hat{\alpha}(0, aba) \alpha(\delta(2, a), c) \\
&= \hat{\alpha}(0, aba) \alpha(1, c) \\
&= \hat{\alpha}(0, aba) c \\
&= \hat{\alpha}(0, ab) \alpha(\hat{\delta}(0, ab), a) c \\
&= \hat{\alpha}(0, ab) \alpha(\delta(\hat{\delta}(0, a), b), a) c \\
&= \hat{\alpha}(0, ab) \alpha(\delta(\delta(\hat{\delta}(0, \epsilon), a), b), a) c \\
&= \hat{\alpha}(0, ab) \alpha(\delta(\delta(0, a), b), a) c \\
&= \hat{\alpha}(0, ab) \alpha(\delta(1, b), a) c
\end{aligned}$$

$$= \hat{\alpha}(0, ab)\alpha(2, a)c$$

$$= \hat{\alpha}(0, ab)ac$$

$$= \hat{\alpha}(0, a)\alpha(\hat{\delta}(0, a), b)ac$$

$$= \hat{\alpha}(0, a)\alpha(\delta(\hat{\delta}(0, \epsilon), a), b)ac$$

$$= \hat{\alpha}(0, a)\alpha(\delta(0, a), b)ac$$

$$= \hat{\alpha}(0, a)\alpha(1, b)ac$$

$$= \hat{\alpha}(0, a)bac$$

$$= \hat{\alpha}(0, \epsilon)\alpha(\hat{\delta}(0, \epsilon), a)bac$$

$$= \hat{\alpha}(0, \epsilon)\alpha(0, a)bac$$

$$= \hat{\alpha}(0, \epsilon)abac$$

$$= \epsilon abac$$

$$= abac$$

$$f_M(caa) = \epsilon \hat{\alpha}(0, abac)\omega(\hat{\delta}(0, ca)a)$$

$$= \hat{\alpha}(0, ca)\alpha(\delta(\hat{\delta}(0, c)a)a)$$

$$= \hat{\alpha}(0, ca)\alpha(\delta(\delta(\hat{\delta}(0, \epsilon)c)a)a)$$

$$= \hat{\alpha}(0, ca)\alpha(\delta(\delta(0, c)a)a)$$

$$= \hat{\alpha}(0, ca)\alpha(\delta(3, a)a)$$

$$= \hat{\alpha}(0, ca)\alpha(1, a)$$

$$= \hat{\alpha}(0, ca)\epsilon$$

$$= \hat{\alpha}(0, c)\alpha(\hat{\delta}(0, c)a)\epsilon$$

$$= \hat{\alpha}(0, c)\alpha(3, a)\epsilon$$

$$= \hat{\alpha}(0, c)a\epsilon$$

$$= \hat{\alpha}(0, \epsilon)\alpha(\hat{\delta}(0, \epsilon)c)a\epsilon$$

$$= \hat{\alpha}(0, \epsilon)\alpha(0, c)a\epsilon$$

$$= \hat{\alpha}(0, \epsilon)ca\epsilon$$

$$= \epsilon ca\epsilon$$

$$= ca$$

c)

$$\{w \in A^* \mid w = u^1v^1, u, v \in A\}$$

A2

	$\omega:$	q	$\omega(q)$
$Q = \{\epsilon, 0, 1, 2, 3\} \quad A = \{0, 1, 2, 3\}$		0	0
$B = \{0, 1, 2, 3\} \quad q_I = \epsilon$		1	3
$\iota = \{0, 1, 2, 3\}$		2	2
		3	1

α, δ	$q \in Q$	$a \in A$	$\delta(q, a)$	$\alpha(q, a)$
	ϵ	0	0	0
	ϵ	1	1	1
	ϵ	2	2	2
	ϵ	3	3	3
	0	0	0	0
	0	1	1	1
	0	2	2	2
	0	3	3	3
	1	0	1	0
	1	1	2	1
	1	2	3	2
	1	3	0	3
	2	0	2	0
	2	1	3	1
	2	2	0	2
	2	3	1	3
	3	0	3	0
	3	1	0	1
	3	2	1	2
	3	3	2	3

Not sure, ob wir f_M auch definieren müssen.

Es gilt $f = f_M$, da bei Eingaben $a \in A$ keine undefinierten Zustände oder Ausgaben erzeugt werden können.

A3

$Q = \{in\}$	$A = \{0, 1, 2, 3\}$	δ, α	$q \in Q$	$a \in A$	$\delta(q, a)$	$\alpha(q, a)$
$B = \{\epsilon, 0, 1, 2, 3\}$	$q_I = in$		in	0	in	3
$\iota = \epsilon$	$\omega = \epsilon$		in	1	in	2
			in	2	in	1
			in	3	in	0

A4

Hier steht was.