Grundlagen der Rechnerarchitektur

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1 Zähler

(a)

Flanke	$\text{state}_2[t]$	$\text{state}_1[t]$	$\text{state}_0[t]$	$\text{state}_2[t+1]$	$\text{state}_1[t+1]$	$\text{state}_0[t+1]$
0	0	0	0	0	0	0
0	0	0	1	0	0	1
0	0	1	0	0	1	0
0	0	1	1	0	1	1
0	1	0	0	1	0	0
0	1	0	1	1	0	1
0	1	1	0	1	1	0
0	1	1	1	0	1	1
1	0	0	0	0	0	1
1	0	0	1	0	1	0
1	0	1	0	0	1	1
1	0	1	1	1	0	0
1	1	0	0	1	0	1
1	1	0	1	1	1	0
1	1	1	0	1	1	1
1	1	1	1	0	0	0

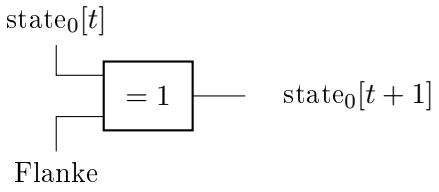
(b)

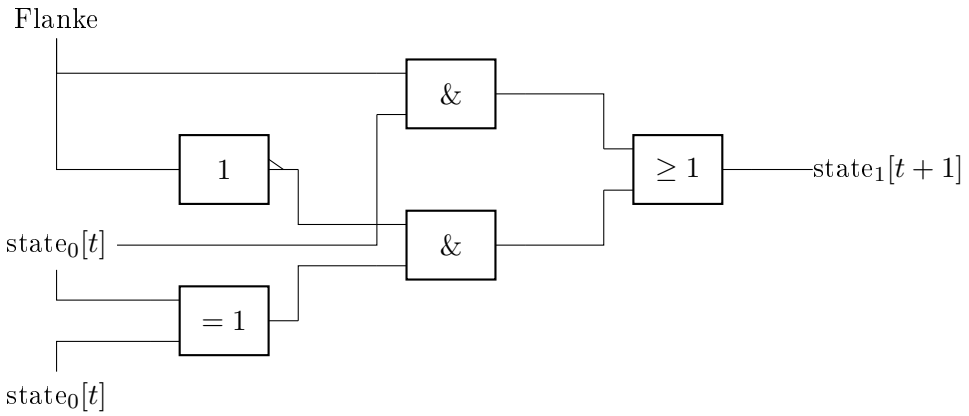
$$\begin{aligned}
\text{state}_0[t+1] &= \text{Flanke} \cdot (\overline{\text{state}_2[t]} \cdot \overline{\text{state}_1[t]} \cdot \overline{\text{state}_0[t]} + \\
&\quad \overline{\text{state}_2[t]} \cdot \text{state}_1[t] \cdot \overline{\text{state}_0[t]} + \\
&\quad \text{state}_2[t] \cdot \overline{\text{state}_1[t]} \cdot \overline{\text{state}_0[t]} + \\
&\quad \text{state}_2[t] \cdot \text{state}_1[t] \cdot \overline{\text{state}_0[t]}) \\
&\quad + \overline{\text{Flanke}} \cdot \text{state}_0[t] \\
&= \text{Flanke} \cdot \overline{\text{state}_0[t]} + \overline{\text{Flanke}} \cdot \text{state}_0[t] \\
&= \text{Flanke} \oplus \text{state}_0[t]
\end{aligned}$$

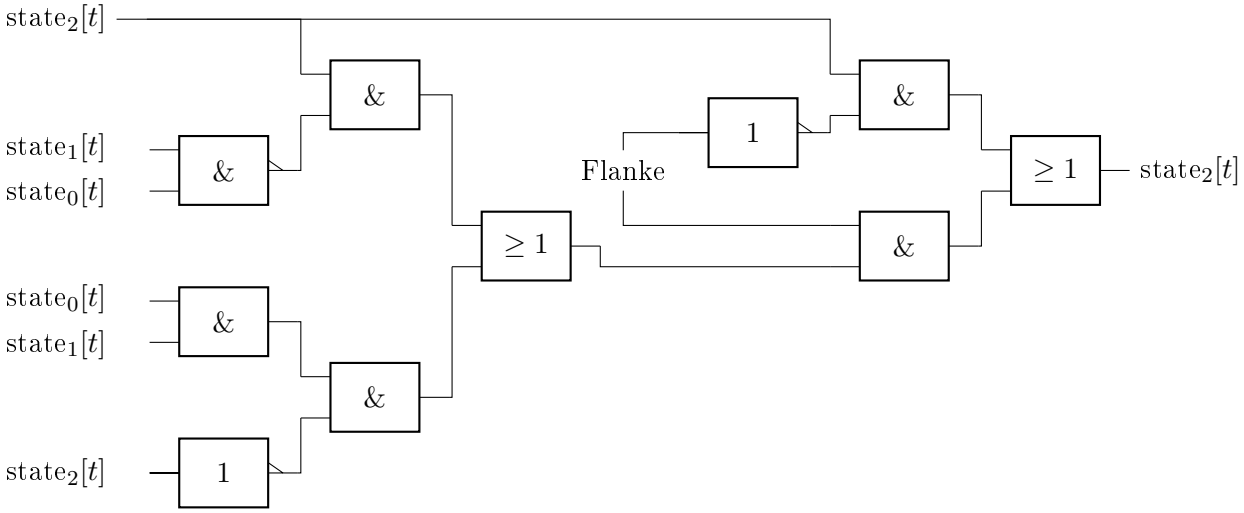
$$\begin{aligned}
\text{state}_1[t+1] &= \text{Flanke} \cdot (\overline{\text{state}_2[t]} \cdot \overline{\text{state}_1[t]} \cdot \text{state}_0[t] + \\
&\quad \overline{\text{state}_2[t]} \cdot \text{state}_1[t] \cdot \overline{\text{state}_0[t]} + \\
&\quad \text{state}_2[t] \cdot \overline{\text{state}_1[t]} \cdot \text{state}_0[t] + \\
&\quad \text{state}_2[t] \cdot \text{state}_1[t] \cdot \overline{\text{state}_0[t]}) \\
&\quad + \overline{\text{Flanke}} \cdot \text{state}_1[t] \\
&= \text{Flanke} \cdot (\text{state}_1[t] \oplus \text{state}_0[t]) + \overline{\text{Flanke}} \cdot \text{state}_1[t]
\end{aligned}$$

$$\begin{aligned}
\text{state}_2[t+1] &= \text{Flanke} \cdot (\overline{\text{state}_2[t]} \cdot \text{state}_1[t] \cdot \text{state}_0[t] + \\
&\quad \text{state}_2[t] \cdot \overline{\text{state}_1[t]} \cdot \overline{\text{state}_0[t]} + \\
&\quad \text{state}_2[t] \cdot \overline{\text{state}_1[t]} \cdot \text{state}_0[t] + \\
&\quad \text{state}_2[t] \cdot \text{state}_1[t] \cdot \overline{\text{state}_0[t]}) \\
&\quad + \overline{\text{Flanke}} \cdot \text{state}_2[t] \\
&= \text{Flanke} \cdot (\overline{\text{state}_2[t]} \cdot \text{state}_1[t] \cdot \text{state}_0[t] + \\
&\quad \text{state}_2[t] \cdot \overline{\text{state}_1[t] \cdot \text{state}_0[t]}) + \\
&\quad \overline{\text{Flanke}} \cdot \text{state}_2[t]
\end{aligned}$$

(c)




Flanke
&
1
≥ 1
state$_1[t+1]$
state$_0[t]$
&
= 1
state$_0[t]$


state$_2[t]$
&
&
state$_1[t]$
&
state$_0[t]$
1
Flanke
≥ 1
state$_2[t]$
≥ 1
&
state$_0[t]$
&
state$_1[t]$
&
state$_2[t]$
1