

Grundlagen der Digitaltechnik

7. Lösungsblatt

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1. Aufgabe:

$$1.1 \quad y = \bar{b} \& (\bar{a} \bar{c} \vee \bar{d} \bar{c} \vee a d c) \vee b \& 1$$

$$= \bar{b} \& F_{\bar{b}} \vee b \& F_b$$

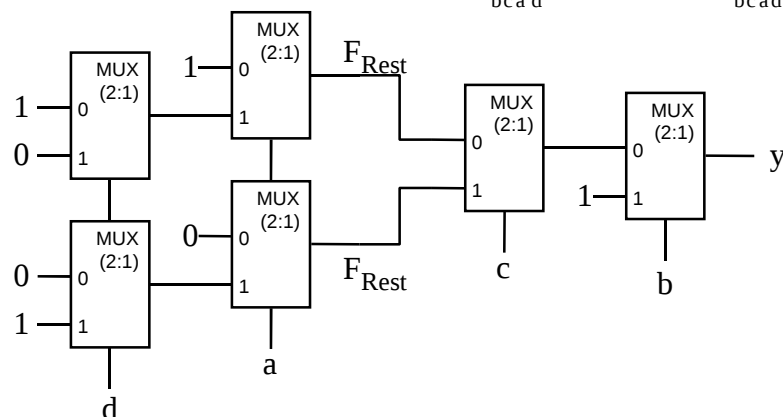
$$1.2 \quad F_{\bar{b}} = \bar{c} \bar{a} \vee \bar{c} \bar{d} \vee a d c$$

$$= \bar{c} (\bar{a} \vee \bar{d}) \vee c (a d) = \bar{c} \& F_{\bar{b}\bar{c}} \vee c \& F_{bc}$$

$$F_{\bar{b}\bar{c}} = \bar{a} \& 1 \vee a \& \bar{d} \quad F_{bc} = \bar{a} \& 0 \vee a \& d$$

$$F_{\bar{b}ca} = \bar{d} \& 1 \vee d \& 0 = \bar{d} \& F_{\bar{b}ca\bar{d}} \vee d \& F_{\bar{b}cad}$$

$$F_{\bar{b}ca} = \bar{d} \& 0 \vee d \& 1 = \bar{d} \& F_{\bar{b}ca\bar{d}} \vee d \& F_{\bar{b}cad}$$



2. Aufgabe:

2.1

Q^n		X		Q^{n+1}		Flipflop 2		Flipflop 1	
q_2^n	q_1^n	b	a	q_2^{n+1}	q_1^{n+1}	J_2	K_2	J_1	K_1
0	0	0	0	0	1	0	-	1	-
0	0	0	1	0	1	0	-	1	-
0	0	1	-	1	1	1	-	1	-
0	1	-	0	1	0	1	-	-	1
0	1	-	1	0	1	0	-	-	0
1	0	-	0	0	0	-	1	0	-
1	0	0	1	1	1	-	0	1	-
1	0	1	1	1	0	-	0	0	-
1	1	-	-	0	0	-	1	-	1

Nein, da die Unterscheidung der Automaten anhand der Ausgabefunktionen erfolgt.

2.2

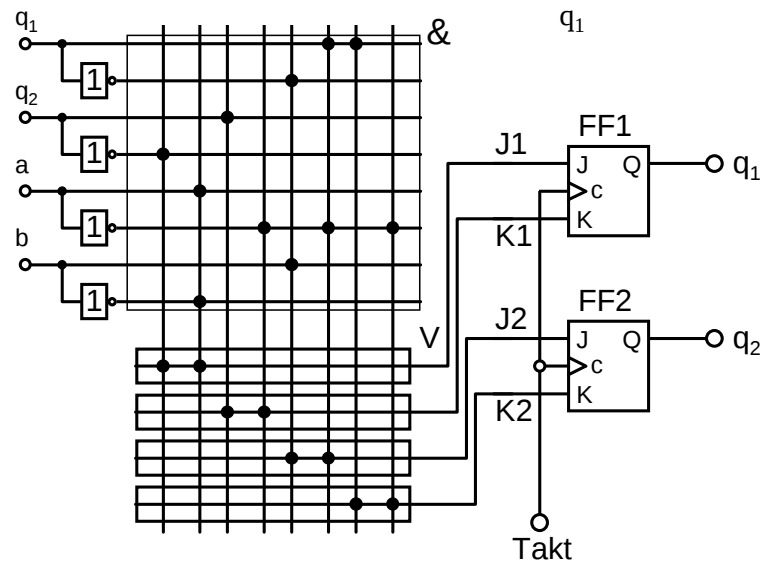
$$J_1 = \overline{q_2} \vee a \overline{b} \quad K_1 = q_2 \vee \overline{a}$$

$$J_2 = \overline{q_1} b \vee q_1 \overline{a} \quad K_2 = q_1 \vee \overline{a}$$

J_1	$\overline{a}$			
	1	1	-	-
	1	1	-	-
	0	0	-	-
K_1	$\overline{a}$			
	-	-	0	1
	-	-	0	1
	-	-	1	1
q_1				q_2

J_2	$\overline{a}$			
	0	0	0	1
	1	1	0	1
	-	-	-	-
K_2	$\overline{a}$			
	-	-	-	-
	1	0	1	1
	1	0	1	1
q_1				q_2

2.3



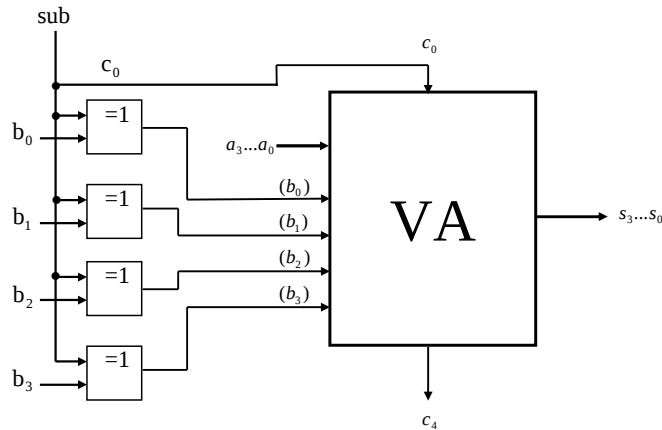
3. Aufgabe:

3.1 111 - 110 - 100 - 000 - 001 - 011 - 111

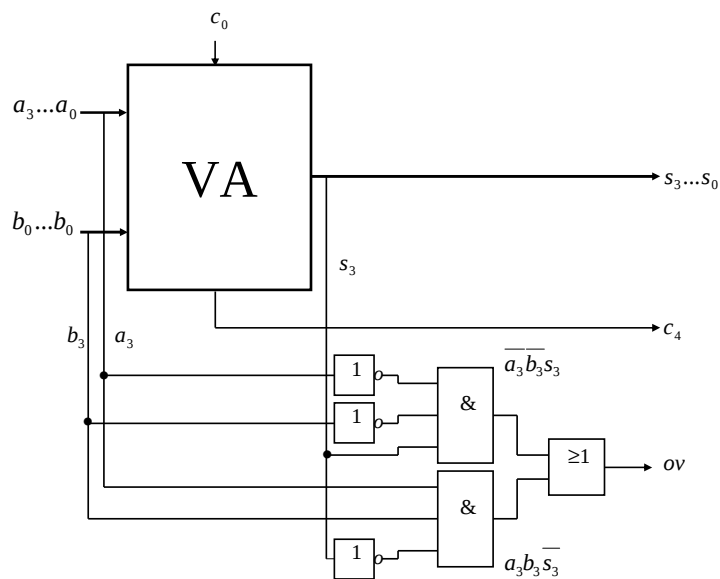
3.2 010, 101

4. Aufgabe:

4.1

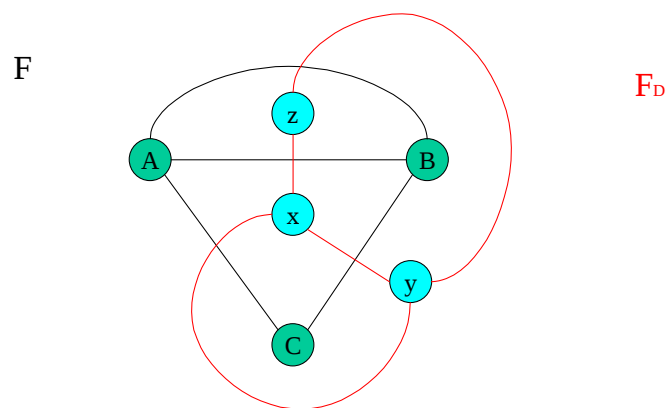


4.2



5. Aufgabe:

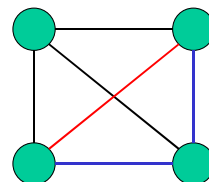
5.1



5.2

bei 4 Knoten:

$$3 + 2 + 1 = 6$$



bei 7 Knoten:

$$6 + 5 + 4 + 3 + 2 + 1 = 21 !!!$$

