Technische Informatik WS 2017/18

Übungsblatt 4

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Aufgabe 1

(a)

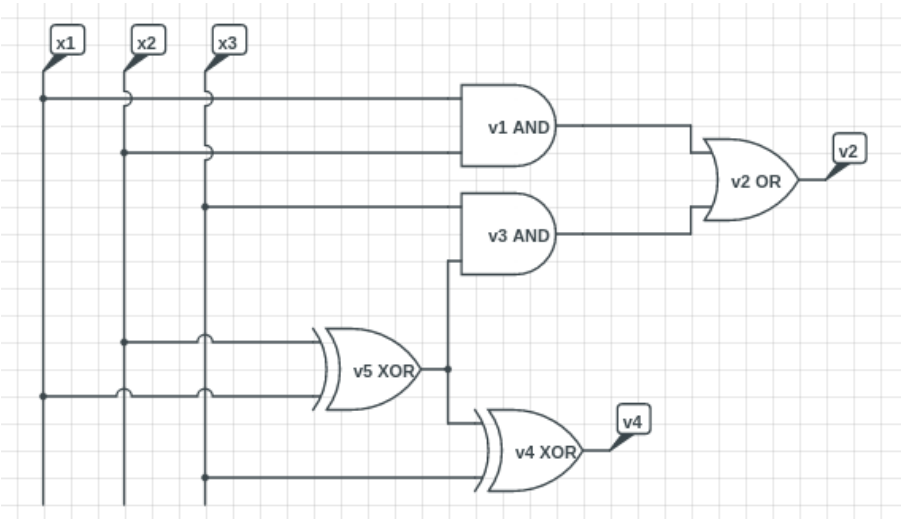


Abbildung 1: SK 1

(b)

Tiefe = 3, Kosten = 5

(c)

$$v_2 = (x_1 \wedge x_2) \vee (x_3 \wedge (x1 \oplus x_2))$$
$$v_4 = (x_3 \oplus (x_1 \oplus x_2))$$

Aufgabe 2

(a)

f	w	z	k	e
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

(b/c)

$e = \bar{f}\bar{w}zk \vee \bar{f}wz\bar{k} \vee \bar{f}wzk \vee f\bar{w}\bar{z}\bar{k} \vee f\bar{w}\bar{z}k \vee fw\bar{z}\bar{k}$

(d)

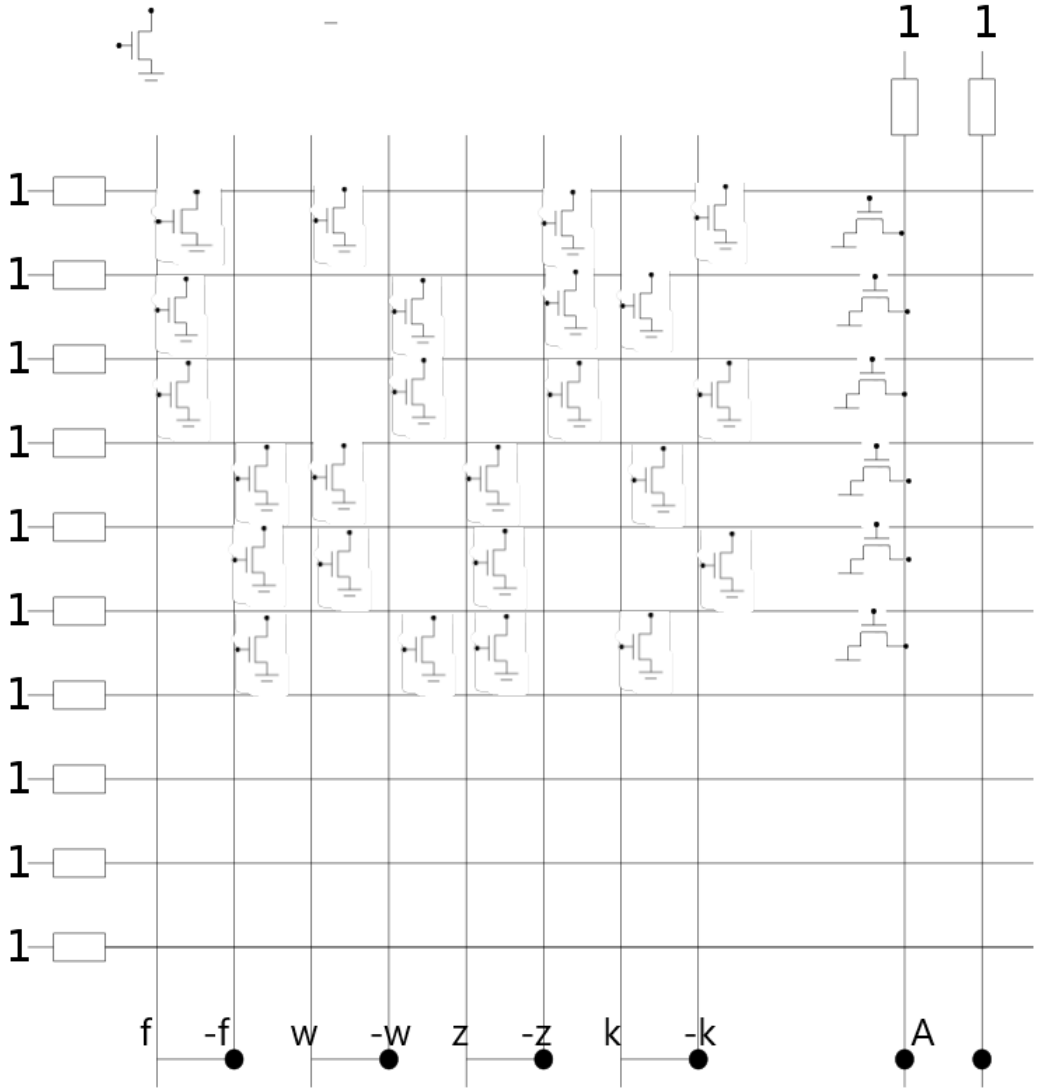
$\bar{e} = (f \vee w \vee z \vee k) \wedge (f \vee w \vee z \vee \bar{k}) \wedge (f \vee w \vee \bar{z} \vee k) \wedge (f \vee \bar{w} \vee z \vee k) \wedge (f \vee \bar{w} \vee z \vee \bar{k}) \wedge (\bar{f} \vee w \vee \bar{z} \vee k) \wedge (\bar{f} \vee w \vee \bar{z} \vee \bar{k}) \wedge (\bar{f} \vee \bar{w} \vee z \vee \bar{k}) \wedge (\bar{f} \vee \bar{w} \vee \bar{z} \vee k) \wedge (\bar{f} \vee \bar{w} \vee \bar{z} \vee \bar{k})$

(e)

Der Farmer kann es schaffen, indem er alle Zustände der DNF (e) aus b/c vermeidet und nur Zustände der KNF($\bar{e}$) abläuft.

Aufgabe 3

(a)



(b)

$cost_1(PLA) = 6, \quad cost_2(PLA) = 6 \cdot 4 + 6 = 30$

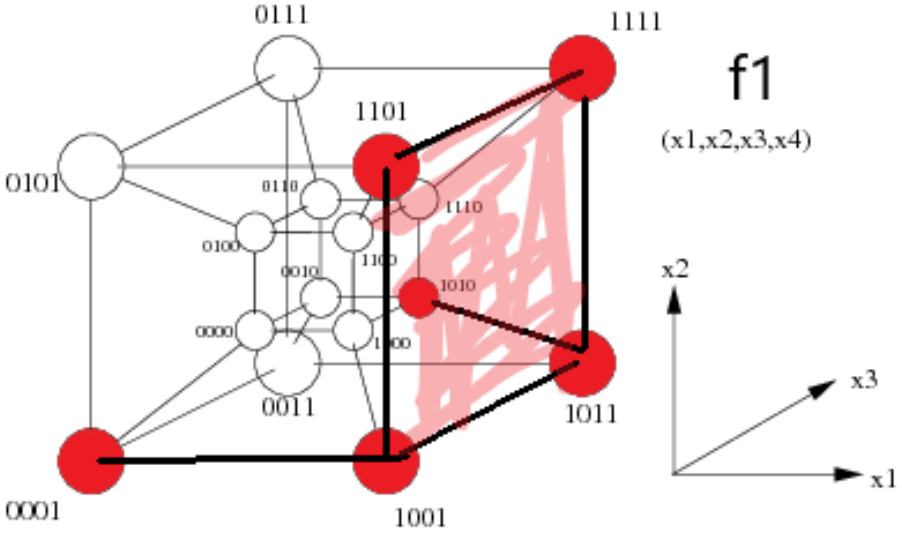
Aufgabe 4

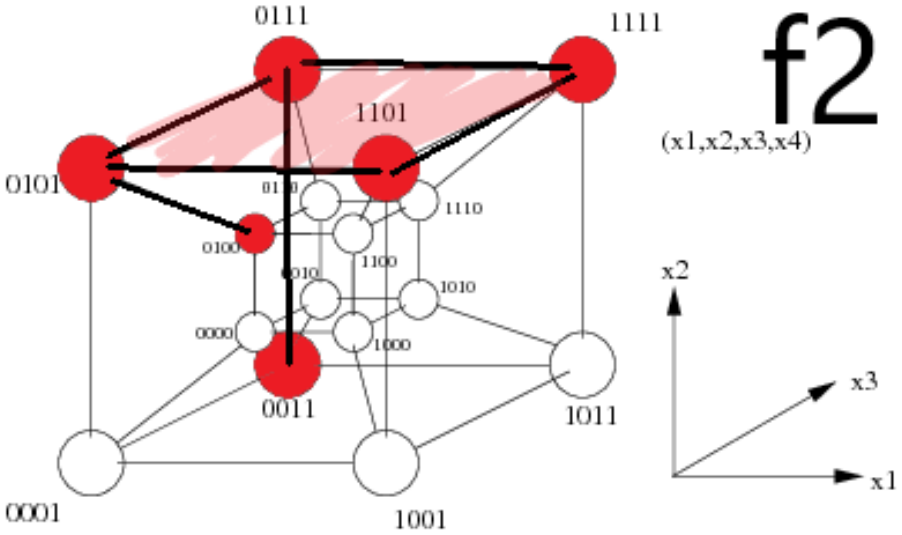
(a)

$$
\begin{aligned}
f_1 :& \bar{x_1}\bar{x_2}\bar{x_3}x_4 \vee \\
& x_1\bar{x_2}\bar{x_3}x_4 \vee \\
& x_1\bar{x_2}x_3\bar{x_4} \vee \\
& x_1\bar{x_2}x_3x_4 \vee \\
& x_1x_2\bar{x_3}x_4 \vee \\
& x_1x_2x_3x_4
\end{aligned}
$$

$$
\begin{aligned}
f_2 :& \bar{x_1}\bar{x_2}x_3x_4 \vee \\
& \bar{x_1}x_2\bar{x_3}\bar{x_4} \vee \\
& \bar{x_1}x_2\bar{x_3}x_4 \vee \\
& \bar{x_1}x_2x_3x_4 \vee \\
& x_1x_2\bar{x_3}x_4 \vee \\
& x_1x_2x_3x_4
\end{aligned}
$$

(b)





(c)

$$f_1) \quad g_1 = \bar{x_2}\bar{x_3}x_4 \vee$$
$$x_1x_2 \vee$$
$$x_1\bar{x_2}x_3$$

$$f_2) \quad g_2 = \bar{x_1}x_3x_4 \vee$$
$$x_2x_2 \vee$$
$$\bar{x_1}\bar{x_2}\bar{x_3}$$