

Rechenanlagen

Übungsblatt 10

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Übung: Dienstag 14:00

Aufgabe 10.1

a)

a_0	a_1	a_2	a_3	l_0	l_1	l_2	l_3	h_0	h_1	h_2
0	0	0	0	0	0	0	1	0	1	0
0	0	0	1	1	0	0	0	1	0	0
0	0	1	0	1	0	0	0	0	0	0
0	0	1	1	1	0	0	0	0	0	1
0	1	0	0	0	1	0	0	1	0	0
0	1	0	1	0	1	0	0	0	1	0
0	1	1	0	0	1	0	0	0	0	1
0	1	1	1	0	0	1	0	1	0	0
1	0	0	0	0	0	1	0	0	1	0
1	0	0	1	0	0	1	0	0	0	1
1	0	1	0	0	0	0	1	1	0	0
1	0	1	1	0	0	0	1	0	0	1

$$\begin{aligned}
 l_0 &= \overline{a_0}a_1a_2a_3 \vee \overline{a_0}\overline{a_1}a_2\overline{a_3} \vee \overline{a_0}\overline{a_1}a_2a_3 \\
 l_1 &= \overline{a_0}a_1\overline{a_2}\overline{a_3} \vee \overline{a_0}a_1\overline{a_2}a_3 \vee \overline{a_0}a_1a_2\overline{a_3} \\
 l_2 &= \overline{a_0}a_1a_2a_3 \vee a_0\overline{a_1}\overline{a_2}\overline{a_3} \vee a_0\overline{a_1}\overline{a_2}a_3 \\
 l_3 &= \overline{a_0}a_1\overline{a_2}\overline{a_3} \vee a_0\overline{a_1}a_2\overline{a_3} \vee a_0\overline{a_1}a_2a_3 \\
 h_0 &= \overline{a_0}\overline{1_1}a_2a_3 \vee \overline{a_0}a_1\overline{a_2}\overline{a_3} \vee \overline{a_0}a_1a_2a_3 \vee a_0\overline{a_1}a_2\overline{a_3} \\
 h_1 &= \overline{a_0}a_1\overline{a_2}\overline{a_3} \vee \overline{a_0}\overline{a_1}a_2\overline{a_3} \vee \overline{a_0}a_1\overline{a_2}a_3 \vee a_0\overline{a_1}\overline{a_2}\overline{a_3} \\
 h_2 &= \overline{a_0}\overline{a_1}a_2a_3 \vee \overline{a_0}a_1a_2\overline{a_3} \vee a_0\overline{a_1}\overline{a_2}a_3 \vee a_0\overline{a_1}a_2a_3
 \end{aligned}$$

- b) Die Belegungen für $a_0a_1 = 1$ sind redundant, da diese keine Tasten repräsentieren.

$l_0(a_0a_1a_2a_3):$

		$\overbrace{\hspace{1.5cm}}^{a_0}$	
		$\overbrace{\hspace{1.5cm}}^{a_1}$	
		*	
$\overbrace{\hspace{0.5cm}}^{a_3}$ $\overbrace{\hspace{0.5cm}}^{a_2}$	1	*	
	1	*	
	1	*	

$\Rightarrow l_0 = \overline{a_0}\overline{a_1}a_2 \vee \overline{a_0}a_1\overline{a_2}a_3$

$l_1(a_0a_1a_2a_3):$

		$\overbrace{\hspace{1.5cm}}^{a_0}$	
		$\overbrace{\hspace{1.5cm}}^{a_1}$	
		1	*
$\overbrace{\hspace{0.5cm}}^{a_3}$ $\overbrace{\hspace{0.5cm}}^{a_2}$		1	*
			*
		1	*

$\Rightarrow l_1 = a_1\bar{a}_2 \vee a_1a_2\bar{a}_3$

$l_2(a_0a_1a_2a_3):$

		$\overbrace{\hspace{1.5cm}}^{a_0}$	
		$\overbrace{\hspace{1.5cm}}^{a_1}$	
		*	1
$\overbrace{\hspace{0.5cm}}^{a_3}$ $\overbrace{\hspace{0.5cm}}^{a_2}$		*	1
	1	*	
		*	

$\Rightarrow l_2 = a_0\bar{a}_2 \vee a_1a_2a_3$

$l_3(a_0a_1a_2a_3):$

		$\overbrace{\hspace{1.5cm}}^{a_0}$	
		$\overbrace{\hspace{1.5cm}}^{a_1}$	
	1	*	
$\overbrace{\hspace{0.5cm}}^{a_3}$ $\overbrace{\hspace{0.5cm}}^{a_2}$		*	
		*	1
		*	1

$\Rightarrow l_3 = a_0a_2 \vee \overline{a_0}\overline{a_1}\overline{a_2}a_3$

$h_0(a_0a_1a_2a_3)$

	1	*	
1		*	
	1	*	
		*	1

 $\Rightarrow h_0 = a_0a_2\bar{a}_3 \vee a_1a_2a_3 \vee a_1\bar{a}_2a_3 \vee \overline{a_0a_1a_2a_3}$

$h_1(a_0a_1a_2a_3)$

1		*	1
	1	*	
		*	
1		*	

 $\Rightarrow h_1 = a_0\bar{a}_2\bar{a}_3 \vee a_1a_3\bar{a}_2 \vee \overline{a_0a_1a_3}$

$h_2(a_0a_1a_2a_3)$

		*	
		*	1
1		*	1
	1	*	

 $\Rightarrow h_2 = a_0a_3 \vee a_1a_2\bar{a}_3 \vee \overline{a_0a_1}a_2a_3$