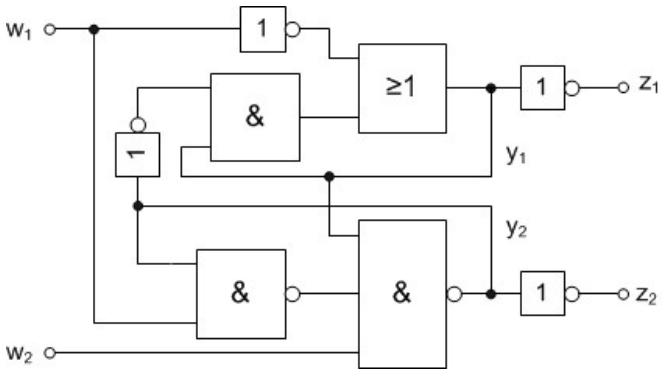
EDA322 Digital konstruktion

Övningar

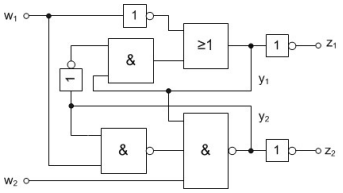
Övning 9.1

Övning 9.1

Vi skall ta fram en tillståndstabell från följande kretsschema



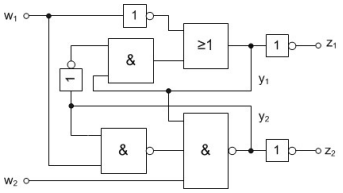
Övning 9.1



Vi får logiken

$$\begin{cases} Y_1 = \overline{w_1} + y_1 \cdot \overline{y_2} \\ z_1 = \overline{y_1} \\ Y_2 = \overline{y_1 \cdot \overline{w_1 \cdot y_2} \cdot w_2} = \overline{y_1} + w_1 \cdot y_2 + \overline{w_2} \\ z_2 = \overline{y_2} \end{cases}$$

Övning 9.1



Vi kan använda Karnaugh-diagram för att ta fram värdena

Y_1	w_2w_1 = 00	01	11	10
00	1	0	0	1
01	1	1	1	1
11	1	0	0	1
10	1	0	0	1

(y_2y_1)

$$\begin{cases} Y_1 = \overline{w_1} + y_1 \cdot \overline{y_2} \\ z_1 = \overline{y_1} \\ Y_2 = \overline{y_1 \cdot \overline{w_1 \cdot y_2} \cdot w_2} = \\ \quad = \overline{y_1} + w_1 \cdot y_2 + \overline{w_2} \\ z_2 = \overline{y_2} \end{cases}$$

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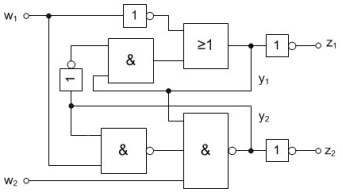

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01	1	1	1	1
11	1	0	0	1
10	1	0	0	1

y_2y_1

$y_1 \cdot \overline{y_2}$

$\overline{w_1}$

$$\begin{cases} Y_1 = \overline{w_1} + y_1 \cdot \overline{y_2} \\ z_1 = \overline{y_1} \\ Y_2 = \overline{y_1 \cdot \overline{w_1 \cdot y_2} \cdot w_2} = \\ \quad = \overline{y_1} + w_1 \cdot y_2 + \overline{w_2} \\ z_2 = \overline{y_2} \end{cases}$$

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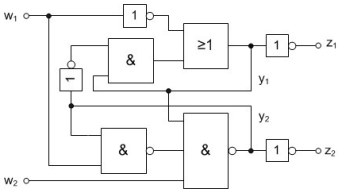

Y_2	w_2w_1 00	01	11	10
00	1	1	1	1
01	1	1	0	0
11	1	1	1	0
10	1	1	1	1

y_2y_1

$$\begin{cases} Y_1 = \overline{w_1} + y_1 \cdot \overline{y_2} \\ z_1 = \overline{y_1} \\ Y_2 = \overline{y_1 \cdot \overline{w_1 \cdot y_2} \cdot w_2} = \\ \quad = \overline{y_1} + w_1 \cdot y_2 + \overline{w_2} \\ z_2 = \overline{y_2} \end{cases}$$

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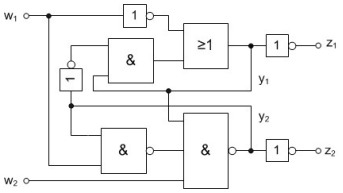

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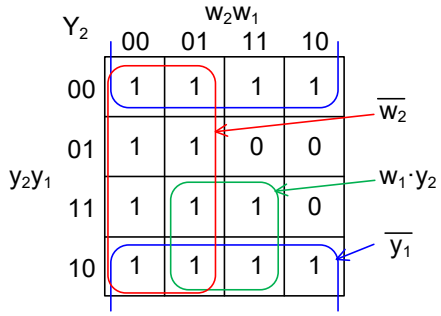
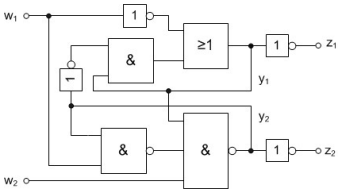


Övning 9.1



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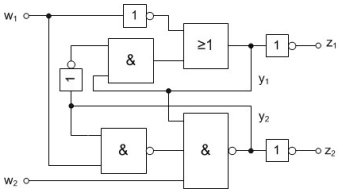
z1

y2y1 \ w2w1	00	01	11	10
00	1	1	1	1
01	0	0	0	0
11	0	0	0	0
10	1	1	1	1

Övning 9.1



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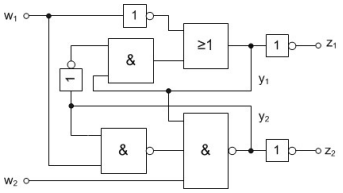
z_1

y_2y_1 \ w_2w_1	00	01	11	10
00	1	1	1	1
01	0	0	0	0
11	0	0	0	0
10	1	1	1	1

$\overline{y_1}$

Övning 9.1



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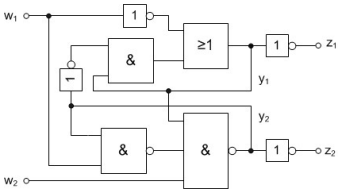
z_2

y_2y_1 \ w_2w_1	00	01	11	10
00	1	1	1	1
01	1	1	1	1
11	0	0	0	0
10	0	0	0	0

Övning 9.1



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z_2 / y_2y_1	w_2w_1 = 00	01	11	10
00	1	1	1	1
01	1	1	1	1
11	0	0	0	0
10	0	0	0	0

$\overline{y_2}$

Övning 9.1

Vi kan direkt föra över värdena från Karnaughdiagrammen till en tillståndstabell om vi bara kommer ihåg att värdena står i udda ordning i diagrammen (00, 01, 11, 10).
* Markerar tillstånd där vi stannar i samma tillstånd

Present state	*Next state*				*Output*
	w_2w_1				
	00	*01*	*10*	*11*	
y_2y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	z_2z_1
00	11	10	11	10	11
01	11	11	01*	01*	10
10	11	10*	11	10*	01
11	11*	10	01	10	00

Övning 9.1

Vi ger tillstånden namn

Present state	Next state w_2w_1				Output
	00	01	10	11	
y_2y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	z_2z_1
00	11	10	11	10	11
01	11	11	01*	01*	10
10	11	10*	11	10*	01
11	11*	10	01	10	00

Present state	Next state w_2w_1				Output
	00	01	10	11	
y_2y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	z_2z_1
A	D	C	D	C	11
B	D	D	B*	B*	10
C	D	C*	D	C*	01
D	D*	C	B	C	00

Övning 9.1

Och ritar tillståndsgraf

Present state	Next state W_2w_1				Output
	00	01	10	11	
y_2y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	Y_2Y_1	z_2z_1
A	D	C	D	C	11
B	D	D	B*	B*	10
C	D	C*	D	C*	01
D	D*	C	B	C	00