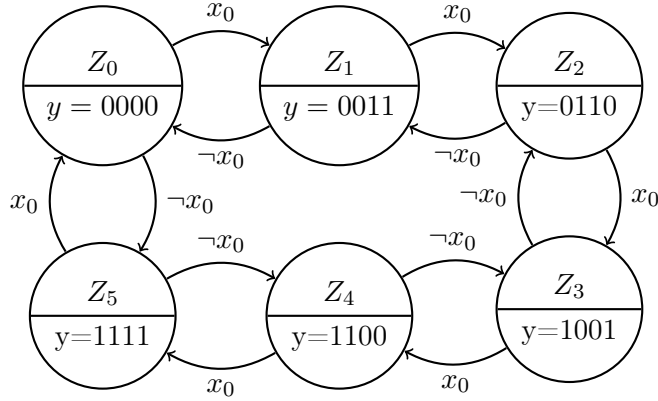


Aufgabe3.1

Die Schaltung soll einen Zähler darstellen der in 3er Schritten vorwärts oder rückwärts zählt. Das Umstellen der Zählrichtung erfolgt durch den Schalter x_0 .



$A = \{X, Y, Z, \delta, \mu\}$, mit

$X: B \Rightarrow \{x_0\}$

$Y: B^4 \Rightarrow \{y_3, y_2, y_1, y_0\}$

$Z: B^6 \Rightarrow \{Z_5, Z_4, Z_3, Z_2, Z_1, Z_0\}$, mit

$ON(Z_0) = \{0000\}$

$ON(Z_1) = \{0011\}$

$ON(Z_2) = \{0110\}$

$ON(Z_3) = \{1001\}$

$ON(Z_4) = \{1100\}$

$ON(Z_5) = \{1111\}$

$\delta: B^3 \Rightarrow \{z_2^+, z_1^+, z_0^+\}$

Für die Zustandsübergangsfunktion gilt

$z_2^+ = (x_0 \wedge \neg z_2 \wedge z_1 \wedge \neg z_0) \vee (\neg x_0 \wedge z_1 \wedge z_0) \vee (x_0 \wedge z_2 \wedge \neg z_0)$

$z_1^+ = (\neg x_0 \wedge \neg z_2 \wedge \neg z_1 \wedge z_0) \vee (\neg x_0 \wedge z_1 \wedge \neg z_0) \vee (x_0 \wedge \neg z_2 \wedge \neg z_1)$

$z_0^+ = \neg z_0$

$\mu: B^4 \Rightarrow \{y_3, y_2, y_1, y_0\}$, mit

$y_3 = z_2 \vee (z_1 \wedge z_0)$

$y_2 = z_2 \vee z_1 \wedge z_0$

$y_1 = \neg z_1 \wedge \neg z_0 \vee z_1 \wedge \neg z_0$

$y_0 = z_0$

x_0	Z	z_2	z_1	z_0	y_3	y_2	y_1	y_0	Z^+	z_2^+	z_1^+	z_0^+
0	Z_0	0	0	0	0	0	0	0	Z_1	0	0	1
0	Z_1	0	0	1	0	0	1	1	Z_2	0	1	0
0	Z_2	0	1	0	0	1	1	0	Z_3	0	1	1
0	Z_3	0	1	1	1	0	0	1	Z_4	1	0	0
0	Z_4	1	0	0	1	1	0	0	Z_5	1	0	1
0	Z_5	1	0	1	1	1	1	1	Z_0	0	0	0
0	—	1	1	0	*	*	*	*	—	*	*	*
0	—	1	1	1	*	*	*	*	—	*	*	*
1	Z_0	0	0	0	0	0	0	0	Z_5	1	0	1
1	Z_1	0	0	1	0	0	1	1	Z_0	0	0	0
1	Z_2	0	1	0	0	1	1	0	Z_1	0	0	1
1	Z_3	0	1	1	1	0	0	1	Z_2	0	1	0
1	Z_4	1	0	0	1	1	0	0	Z_3	0	1	1
1	Z_5	1	0	1	1	1	1	1	Z_4	1	0	0
1	—	1	1	0	*	*	*	*	—	*	*	*
1	—	1	1	1	*	*	*	*	—	*	*	*

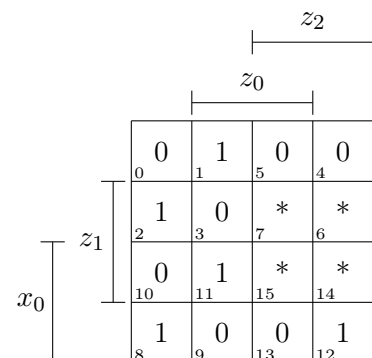


Diagram illustrating a 2D lattice structure with indices z_0 and z_1 . The lattice is represented by a grid of points, with the horizontal distance between columns labeled z_0 and the vertical distance between rows labeled z_1 . The total horizontal distance is labeled z_2 . The grid contains the following values:

1	0	0	1
1	0	*	*
1	0	*	*
1	0	0	1

The indices for the points are labeled below the grid:

0	1	5	4
2	3	7	6
10	11	15	14
8	9	13	12

 y_3

The diagram shows a 2D array with four columns and two rows. The columns are indexed 0, 1, 5, and 4 from left to right. The rows are indexed 0 and 2 from top to bottom. The array contains the following values:

0	0	1	1
0	1	*	*

Dimensions and indices are indicated by brackets and labels:

- z_0 is the width of the array (4 columns).
- z_2 is the height of the array (2 rows).
- z_1 is the index of the first row (0).
- z_2 is the index of the second row (2).

Figure 1 shows a 2D lattice with a grid of values. The horizontal axis is labeled z_0 and the vertical axis is labeled z_1 . The grid contains the following values:

	0	0	1	1
z_1	1	0	*	*

Indices 0, 1, 5, 4 are positioned above the top row, and indices 2, 3, 7, 6 are positioned below the bottom row.

Diagram illustrating a 2D lattice structure with axes z_0 and z_1 . The lattice points are labeled with values:

	0	1	1	0
z_1	1	0	*	*

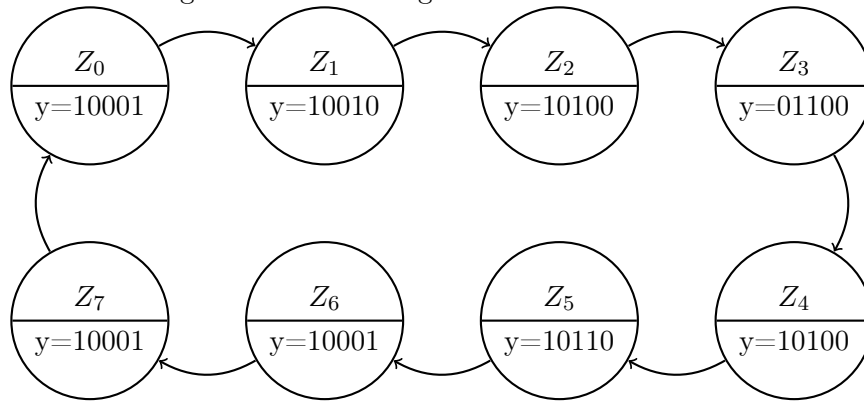
Indices (0, 1, 5, 4) are associated with the top row, and indices (2, 3, 7, 6) are associated with the bottom row.

3

				z_2	
				z_0	
z_1	0	1	1	0	
	2	3	7	6	

Aufgabe 3.2

In dieser Aufgabe soll eine Ampel implementiert werden die Automatisch läuft. Heißt nach einer gewissen Zeit gibt es Automatisch grün die Fußgänger ohne das ein Knopf gedrückt werden muss. Es ist also ein Autonomer-Automat. Folglich beschreibt folgender Automat die Funktion der Ampel.



Z	z_2	z_1	z_0	z_2^+	z_1^+	z_0^+	J_2	K_2	J_1	K_1	J_0	K_0	y_4	y_3	y_2	y_1	y_0
Z_0	0	0	0	0	0	1	0	*	0	*	1	*	1	0	0	0	1
Z_1	0	0	1	0	1	0	0	*	1	*	*	1	1	0	0	1	0
Z_2	0	1	0	0	1	1	0	*	*	0	1	*	1	0	1	0	0
Z_3	0	1	1	1	0	0	1	*	*	1	*	1	0	1	1	0	0
Z_4	1	0	0	1	0	1	*	0	0	*	1	*	1	0	1	0	0
Z_5	1	0	1	1	1	0	*	0	1	*	*	1	1	0	1	1	0
Z_6	1	1	0	1	1	1	*	0	*	0	1	*	1	0	0	0	1
Z_7	1	1	1	0	0	0	*	1	*	1	*	1	1	0	0	0	1

Die Minimierung der Zustandsübergangsfunktion

				z_2	
				z_0	
J_2	1	1	0	0	
	2	3	7	6	
				K_2	

				z_2	
				z_0	
J_2	0	0	*	*	
	2	3	7	6	
				K_2	

