

Exemplu:

Sinteza decodicatorului binar zecimal: 8421

1. Tabelul de adevăr al decodicatorului pentru codul binar-zecimal 8 4 2 1

Cifra zecimală	Codul				Funcții										
	8	4	2	1											
	x4	x3	x2	x1	y0	y1	y2	y3	y4	y5	y6	y7	y8	y9	
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
3	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0
4	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
5	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0
6	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
7	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
9	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0
10	1	0	1	0	*	*	*	*	*	*	*	*	*	*	*
11	1	0	1	1	*	*	*	*	*	*	*	*	*	*	*
12	1	1	0	0	*	*	*	*	*	*	*	*	*	*	*
13	1	1	0	1	*	*	*	*	*	*	*	*	*	*	*
14	1	1	1	0	*	*	*	*	*	*	*	*	*	*	*
15	1	1	1	1	*	*	*	*	*	*	*	*	*	*	*

2. Diagramele Vech-Karnaugh pentru minimizarea funcțiilor :

	Y0			
	00	01	11	10
00	1		*	
01			*	
11			*	*
10			*	*

$$\overline{x_4} * \overline{x_3} * \overline{x_2} * \overline{x_1}$$

	y1			
$\begin{smallmatrix} \diagup & \times 4 \times 2 \\ \times 2 \times 1 & \diagdown \end{smallmatrix}$	00	01	11	10
00			*	
01	1		*	
11			*	*
10			*	*

$$\overline{x_4} \cdot \overline{x_3} \cdot \overline{x_2} \cdot x_1$$

	y2			
$\begin{smallmatrix} \diagup & \times 4 \times 2 \\ \times 2 \times 1 & \diagdown \end{smallmatrix}$	00	01	11	10
00			*	
01			*	
11			*	*
10	1		*	*

$$\overline{x_3} \cdot x_2 \cdot \overline{x_1}$$

	y3			
$\begin{smallmatrix} \diagup & \times 4 \times 2 \\ \times 2 \times 1 & \diagdown \end{smallmatrix}$	00	01	11	10
00			*	
01			*	
11	1		*	*
10			*	*

$$\overline{x_3} \cdot x_2 \cdot x_1$$

	y4			
x2x1 x4x3	00	01	11	10
00		1	*	
01			*	
11			*	*
10			*	*

$$x_3 * \overline{x_2} * \overline{x_1}$$

	y5			
x2x1 x4x3	00	01	11	10
00			*	
01		1	*	
11			*	*
10			*	*

$$x_3 * \overline{x_2} * x_1$$

	y6			
x2x1 x4x3	00	01	11	10
00			*	
01			*	
11			*	*
10		1	*	*

$$x_3 * x_2 * \overline{x_1}$$

	y7			
x_2x_1 \ x_4x_3	00	01	11	10
00			*	
01			*	
11		1	*	*
10			*	*

$$x_3 * x_2 * x_1$$

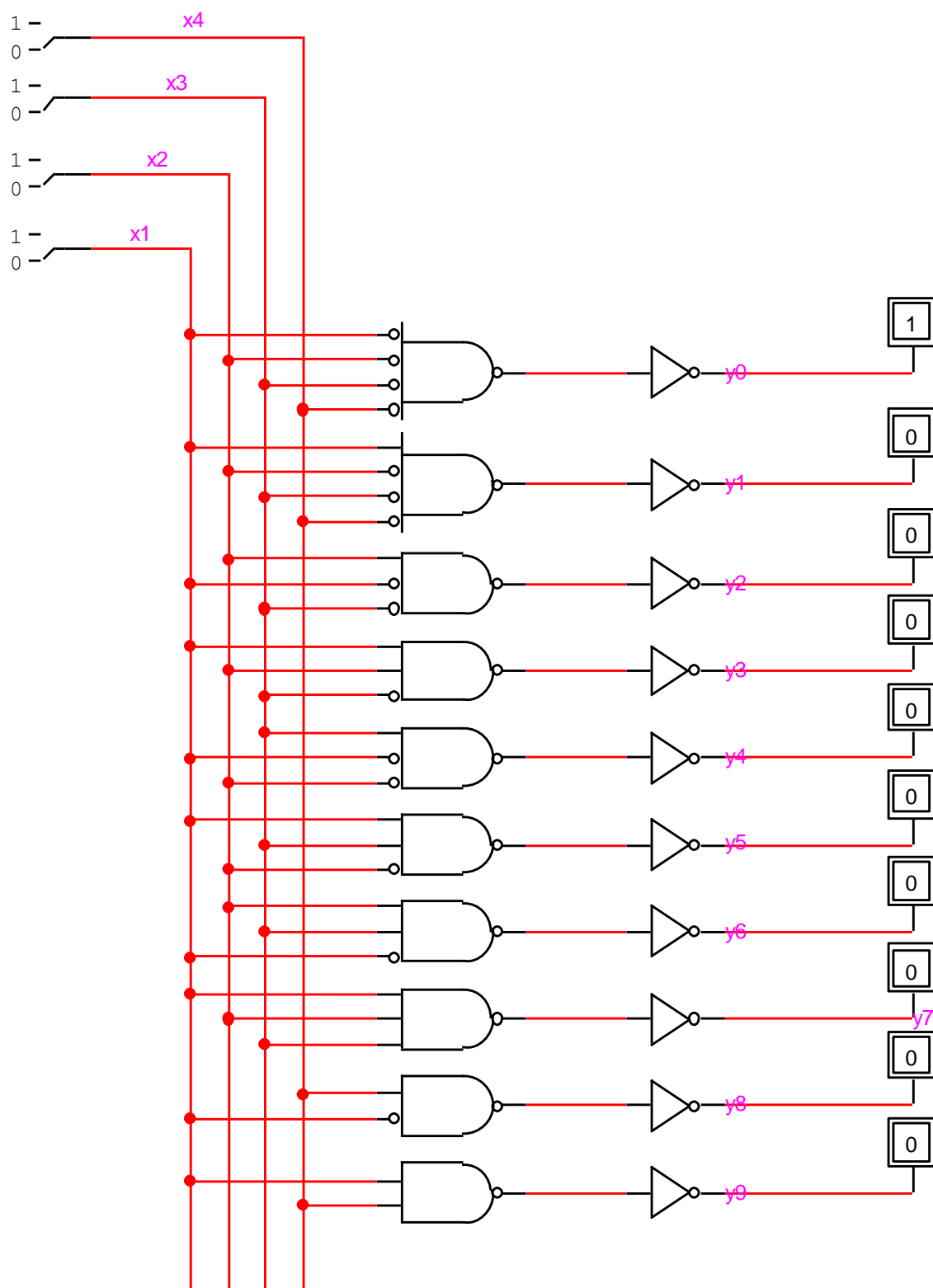
	y8			
x_2x_1 \ x_4x_3	00	01	11	10
00			*	1
01			*	
11			*	*
10			*	*

$$x_4 * \overline{x_1}$$

	y9			
x_2x_1 \ x_4x_3	00	01	11	10
00			*	
01			*	1
11			*	*
10			*	*

$$x_4 * x_1$$

3. Schema decodificatorului binar-zecimal



Exemplu: Sinteza codificatorului binar zecimal: 4 4 1 -2

1. Tabelul de adevăr al codificatorului pentru codul binar-zecimal 4 4 1 -2

Cifra zecimala	Intrările										Iesirile			
											4	4	1	-2
	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	f4	f3	f2	f1
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	0	0	0	0	1	0
2	0	0	1	0	0	0	0	0	0	0	0	1	0	1
3	0	0	0	1	0	0	0	0	0	0	0	1	1	1
4	0	0	0	0	1	0	0	0	0	0	0	1	0	0
5	0	0	0	0	0	1	0	0	0	0	1	0	1	0
6	0	0	0	0	0	0	1	0	0	0	1	1	0	1
7	0	0	0	0	0	0	0	1	0	0	1	1	1	1
8	0	0	0	0	0	0	0	0	1	0	1	1	0	0
9	0	0	0	0	0	0	0	0	0	1	1	1	1	0
10	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15	*	*	*	*	*	*	*	*	*	*	*	*	*	*

2. Funcțiile de la ieșirea codificatorului:

$$\begin{aligned}
 f4 &= x5 \vee x6 \vee x7 \vee x8 \vee x9 \\
 f3 &= x2 \vee x3 \vee x4 \vee x6 \vee x7 \vee x8 \vee x9 \\
 f2 &= x1 \vee x3 \vee x5 \vee x7 \vee x9 \\
 f1 &= x2 \vee x3 \vee x6 \vee x7
 \end{aligned}$$

Folosind legile lui De Morgan, transformam relațiile de mai sus pentru setul de elemente SI-NU:

$$\begin{aligned}
 f4 &= \overline{x5} * \overline{x6} \vee \overline{x7} \vee \overline{x8} \vee \overline{x9} \\
 f3 &= \overline{x2} * \overline{x3} * \overline{x4} * \overline{x6} * \overline{x7} * \overline{x8} * \overline{x9} \\
 f2 &= \overline{x1} * \overline{x3} * \overline{x5} * \overline{x7} * \overline{x9} \\
 f1 &= \overline{x2} * \overline{x3} * \overline{x6} * \overline{x7}
 \end{aligned}$$

4. Schema codificatorului

