

Eletrônica para Informática
Aluna: Larissa dos Santos Holanda

Fazer um decodificador de código "2 entre 5" para código "BCD". O circuito final deverá ser simplificado pelos mapas de Karnaugh. Fazer a simulação no software Proteus.

Decodificador de código "2 entre 5" para código "BCD".

1º: Tabela de equivalência de código.

Decimal	2 entre 5	BCD
0	D4 D3 D2 D1 D0	A B C D
0	0 0 0 1 1	0 0 0 0
1	0 0 1 0 1	0 0 0 1
2	0 0 1 1 0	0 0 1 0
3	0 1 0 0 1	0 0 1 1
4	0 1 0 1 0	0 1 0 0
5	0 1 1 0 0	0 1 0 1
6	1 0 0 0 1	0 1 1 0
7	1 0 0 1 0	0 1 1 1
8	1 0 1 0 0	1 0 0 0
9	1 1 0 0 0	1 0 0 1

2º Construir a tabela Verdade.

	D4	D3	D2	D1	D0	A	B	C	D
0	0	0	0	0	0				
1	0	0	0	0	1				
2	0	0	0	1	0				
3	0	0	0	1	1	0	0	0	0
4	0	0	1	0	0				
5	0	0	1	0	1	0	0	0	1
6	0	0	1	1	0	0	0	1	0
7	0	0	1	1	1				
8	0	1	0	0	0				
9	0	1	0	0	1	0	0	1	1
10	0	1	0	1	0	0	1	0	0
11	0	1	0	1	1				
12	0	1	1	0	0	0	1	0	1
13	0	1	1	0	1				
14	0	1	1	1	0				
15	0	1	1	1	1				
16	1	0	0	0	0				
17	1	0	0	0	1	0	1	1	0
18	1	0	0	1	0	0	1	1	1
19	1	0	0	1	1				
20	1	0	1	0	0	1	0	0	0
21	1	0	1	0	1				
22	1	0	1	1	0				
23	1	0	1	1	1				
24	1	1	0	0	0	1	0	0	1
25	1	1	0	0	1				
26	1	1	0	1	0				
27	1	1	0	1	1				
28	1	1	1	0	0				
29	1	1	1	0	1				
30	1	1	1	1	0				
31	1	1	1	1	1				

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3º: Encontrar as expressões Booleanas das saídas (A, B, C, D)

A:

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	X	1	X	3	0
		4	X	5	0	7	X
D_3	\bar{D}_2	12	0	13	X	15	X
		8	X	9	0	11	X
		\bar{D}_0	D_0		\bar{D}_0		

D4

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	X	1	0	3	0
		4	1	5	1	7	0
D_3	\bar{D}_2	12	X	13	X	15	X
		8	X	9	X	11	X
		\bar{D}_0	D_0		\bar{D}_0		

$$A = D_4 \bar{D}_1 \bar{D}_0$$

B:

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	X	1	X	3	0
		4	X	5	0	7	X
D_3	\bar{D}_2	12	1	13	X	15	X
		8	X	9	0	11	X
		\bar{D}_0	D_0		\bar{D}_0		

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	1	1	1	3	1
		4	1	5	1	7	1
D_3	\bar{D}_2	12	X	13	X	15	X
		8	X	9	X	11	X
		\bar{D}_0	D_0		\bar{D}_0		

$$B = \bar{D}_4 \bar{D}_0 D_3 + D_4 \bar{D}_2 \bar{D}_3$$

C:

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	X	1	X	3	0
		4	X	5	0	7	1
D_3	\bar{D}_2	12	0	13	X	15	X
		8	X	9	1	11	X
		\bar{D}_0	D_0		\bar{D}_0		

D_4 D_4

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	1	1	1	3	1
		4	1	5	1	7	1
D_3	\bar{D}_2	12	X	13	X	15	X
		8	X	9	X	11	X
		\bar{D}_0	D_0		\bar{D}_0		

$$C = \bar{D}_4 D_0 D_3 + \bar{D}_4 \bar{D}_0 \bar{D}_3 + D_4 \bar{D}_2 \bar{D}_3$$

D:

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	X	1	X	3	0
		4	X	5	1	7	0
D_3	\bar{D}_2	12	1	13	X	15	X
		8	X	9	1	11	X
		\bar{D}_0	D_0		\bar{D}_0		

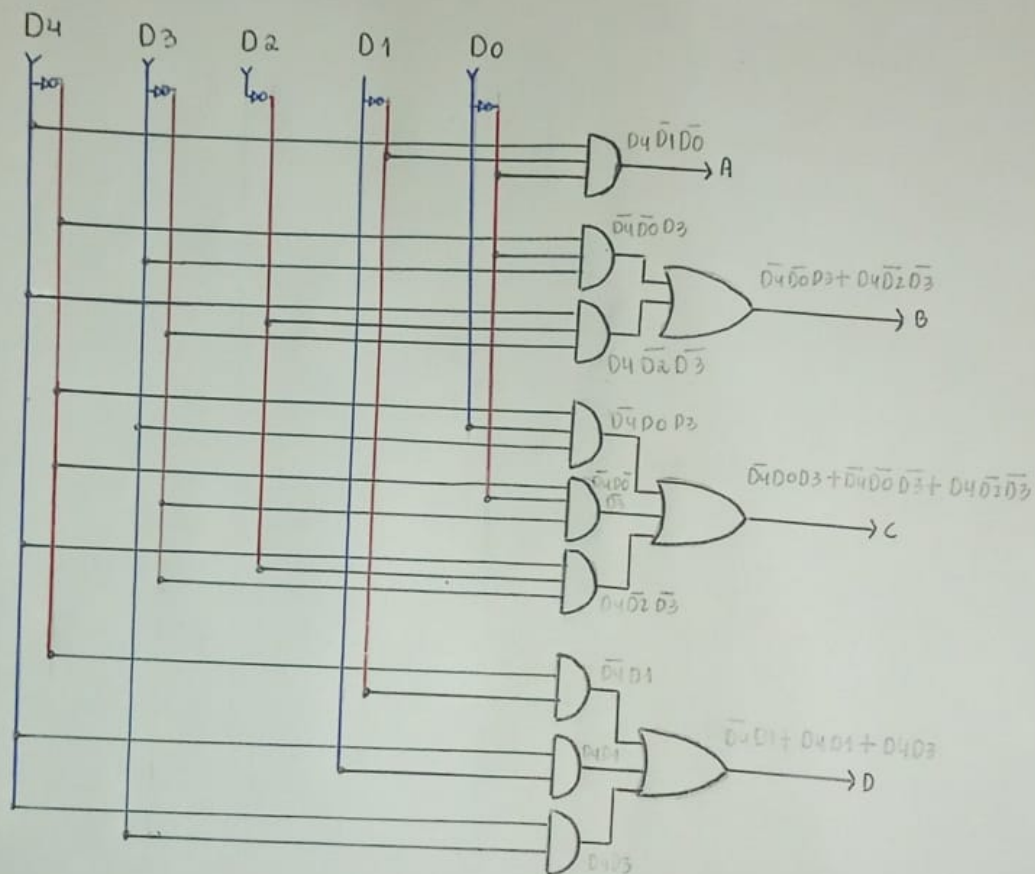
\bar{D}_4 D_4

		\bar{D}_1		D_1			
\bar{D}_3	\bar{D}_2	0	X	1	0	3	1
		4	X	5	1	7	1
D_3	\bar{D}_2	12	X	13	X	15	X
		8	X	9	X	11	X
		\bar{D}_0	D_0		\bar{D}_0		

$$D = \bar{D}_4 \bar{D}_1 + D_4 D_1 + D_4 D_3$$

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4º: Fazer o circuito Final



Expressões

$$A = D_4 \bar{D}_1 \bar{D}_0$$

$$B = \bar{D}_4 \bar{D}_0 D_3 + D_4 \bar{D}_2 \bar{D}_3$$

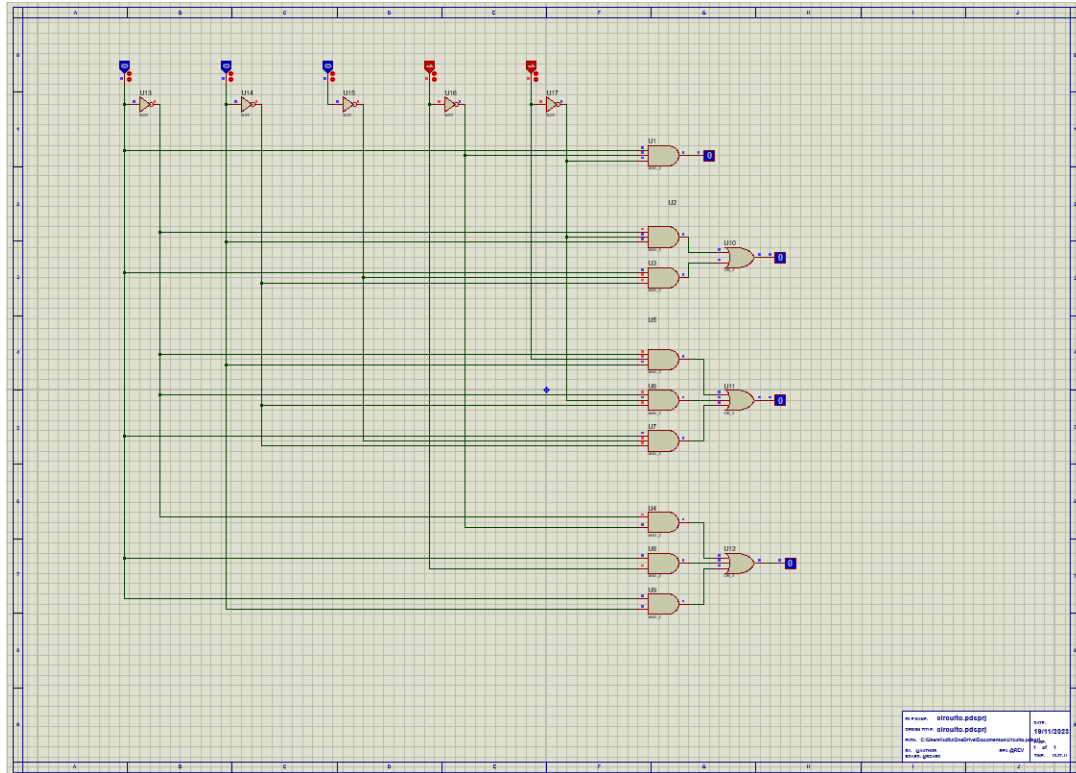
$$C = \bar{D}_4 D_0 D_3 + \bar{D}_4 \bar{D}_0 \bar{D}_3 + D_4 \bar{D}_2 \bar{D}_3$$

$$D = \bar{D}_4 \bar{D}_1 + D_4 D_1 + D_4 D_3$$

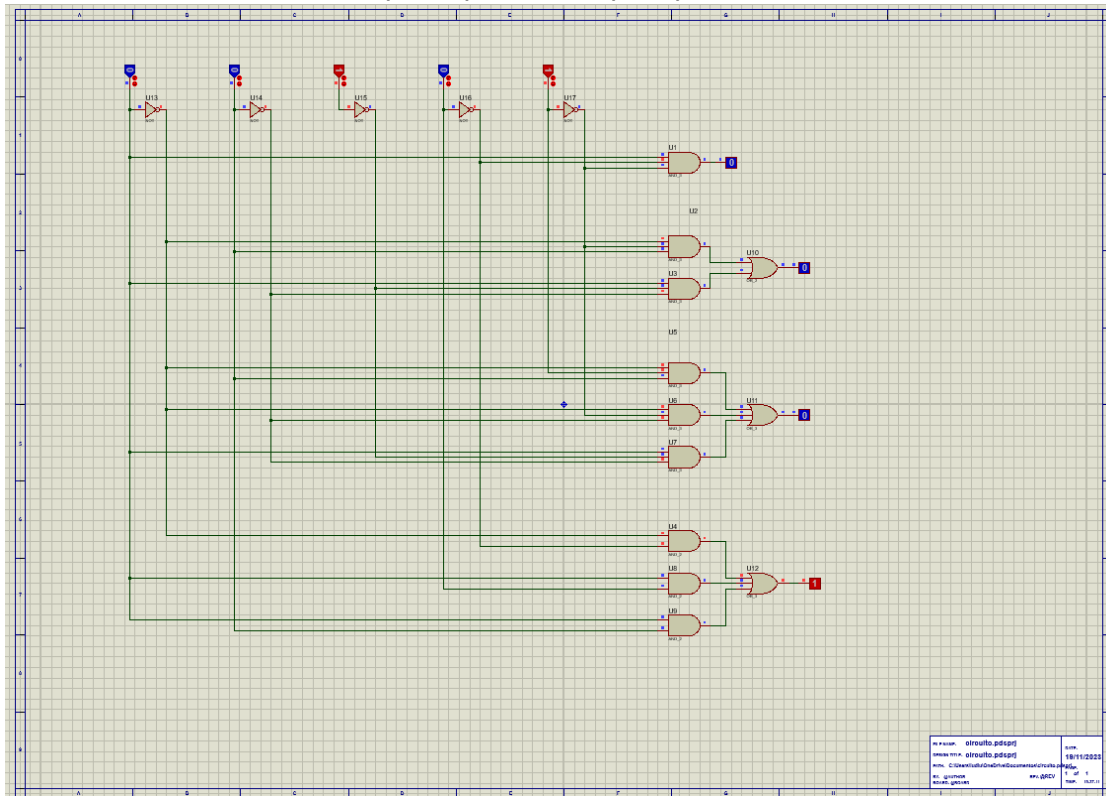
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Simulação do circuito no Proteus

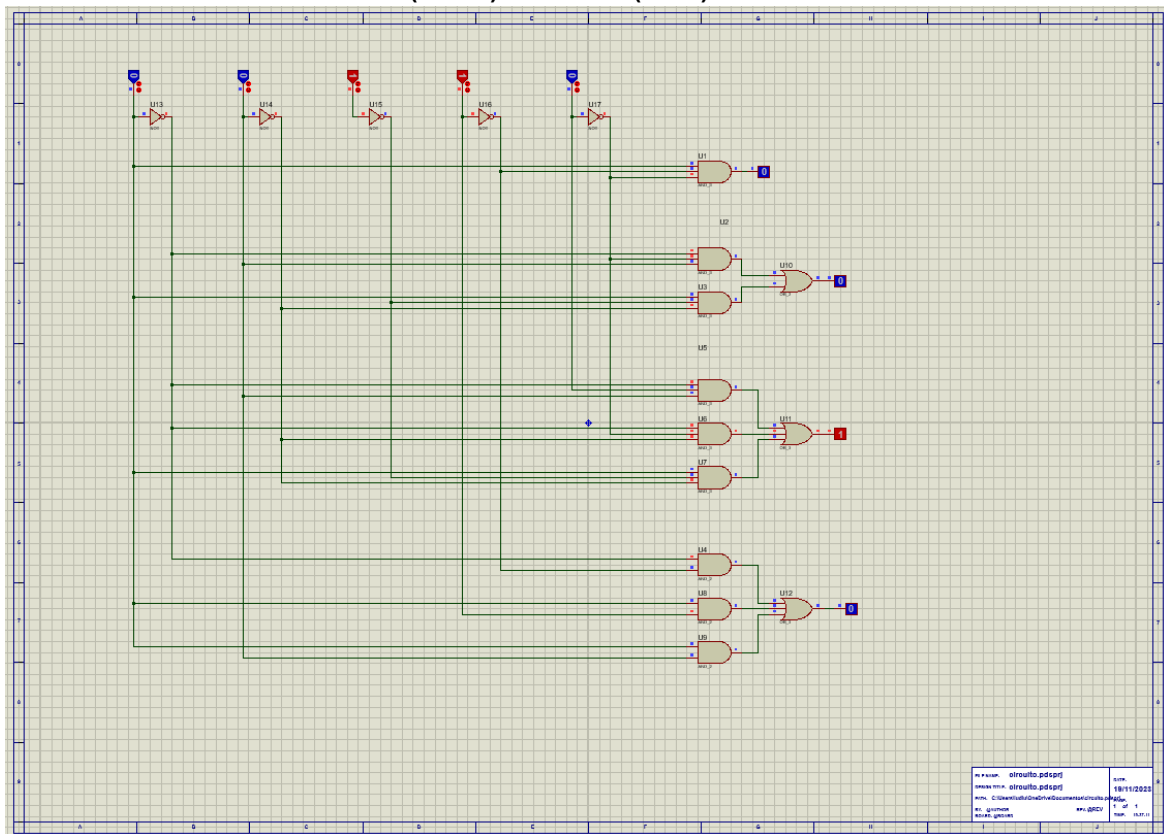
(00011)₂ entre 5 - (0000)BCD



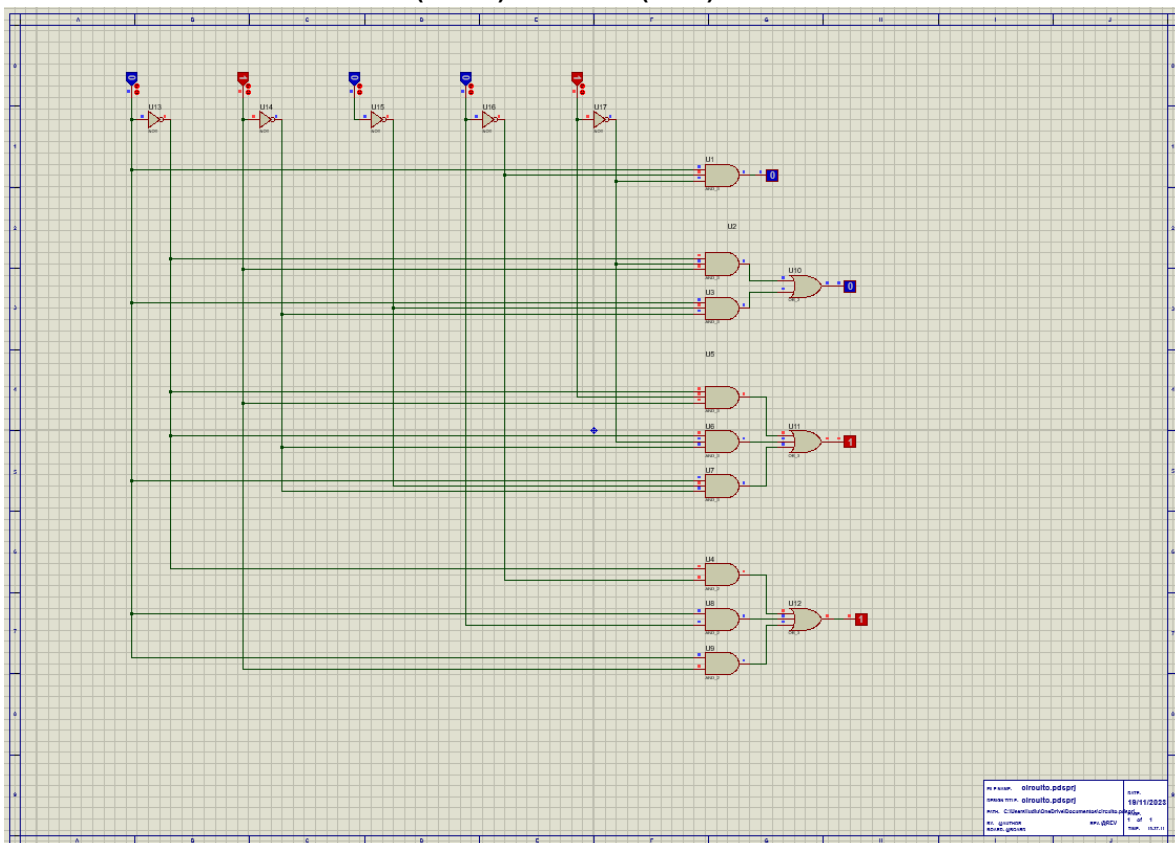
(00101)₂ entre 5 - (0001)BCD



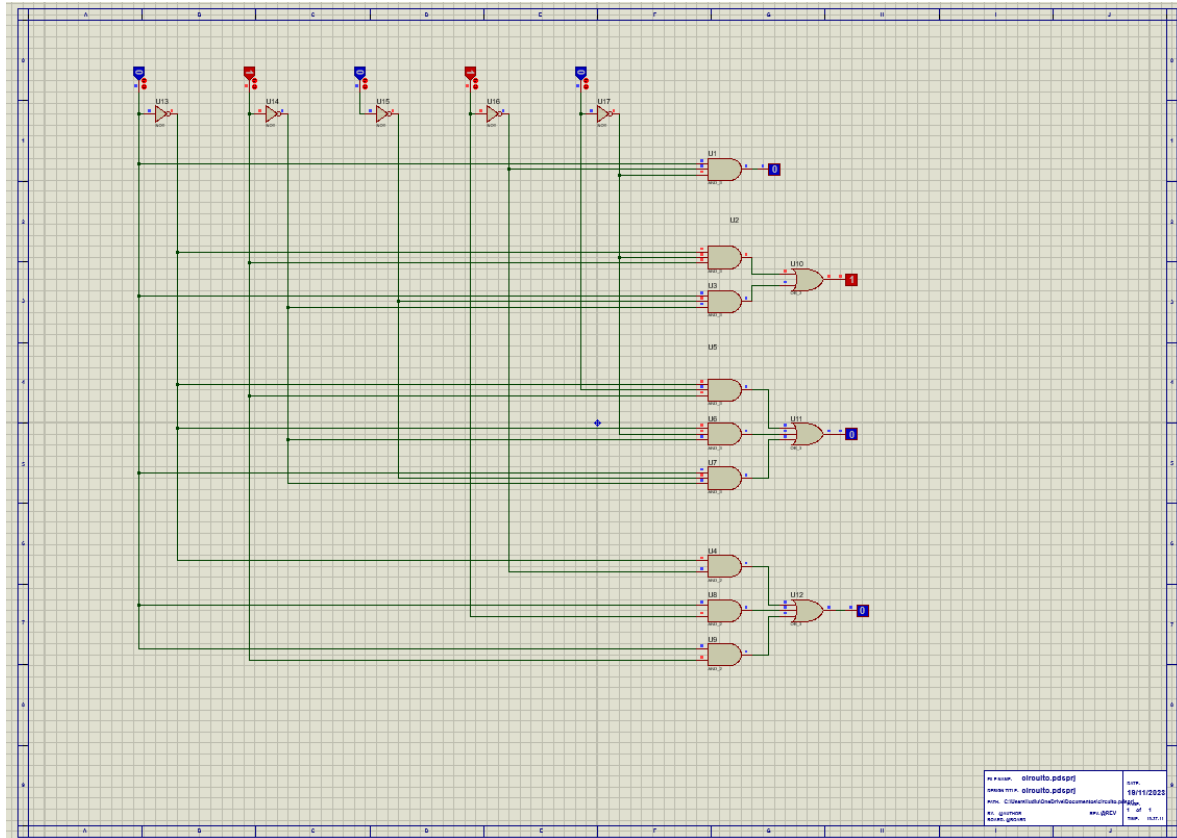
(00110)2 entre 5 - (0010)BCD



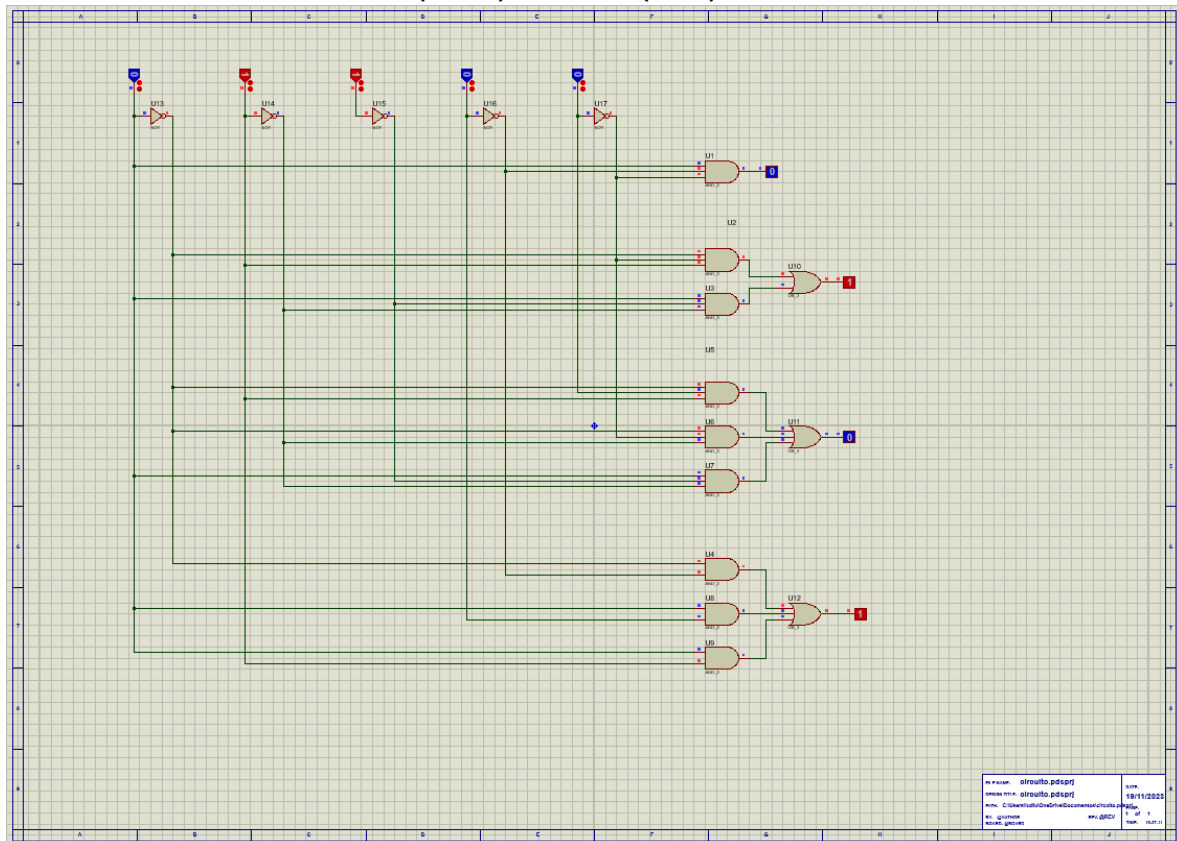
(01001)2 entre 5 - (0011)BCD



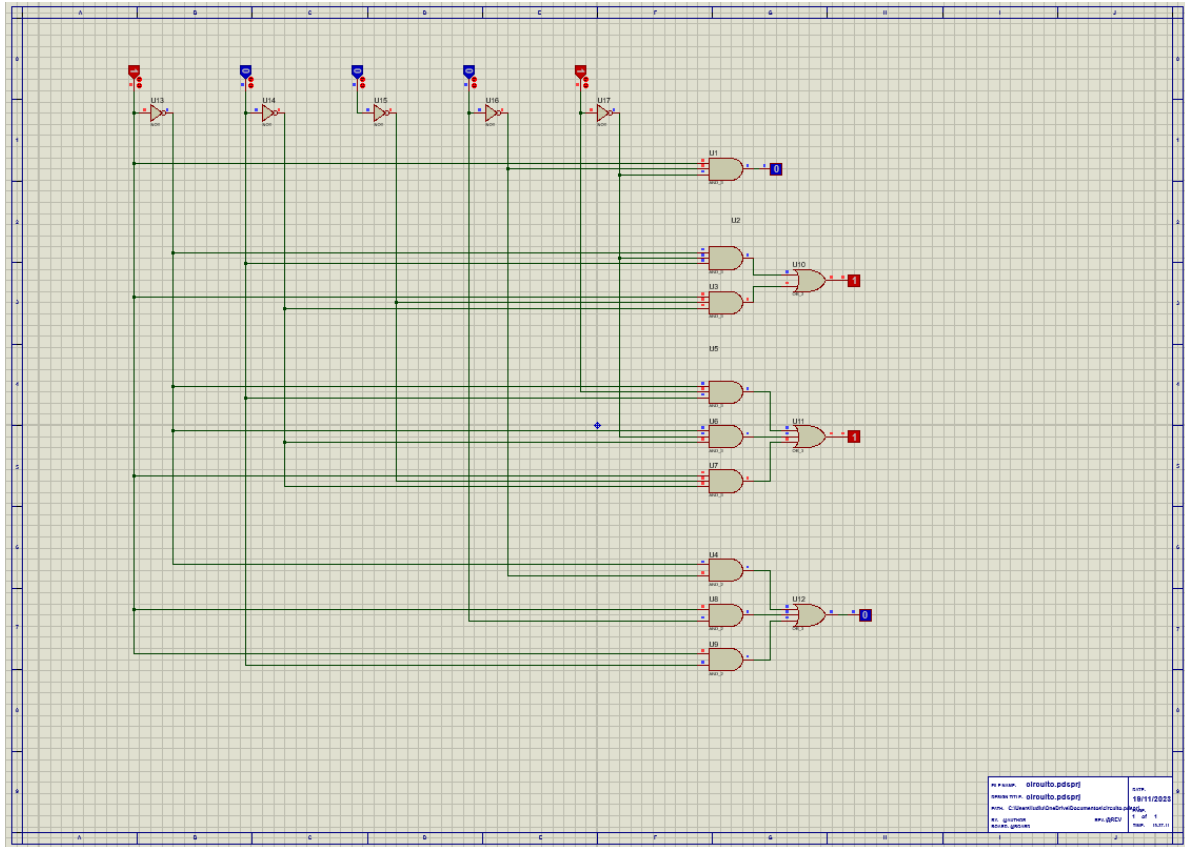
(01010)2 entre 5 - (0100)BCD



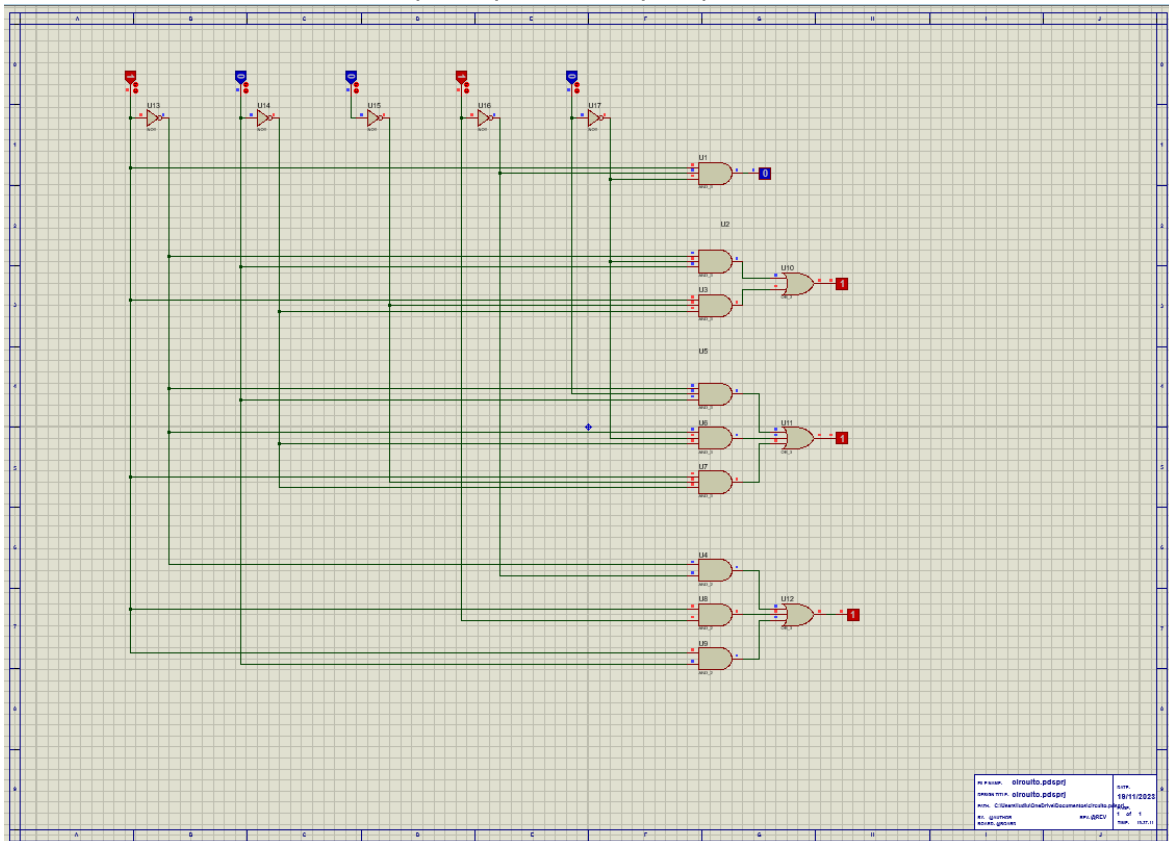
(01100)2 entre 5 - (0101)BCD



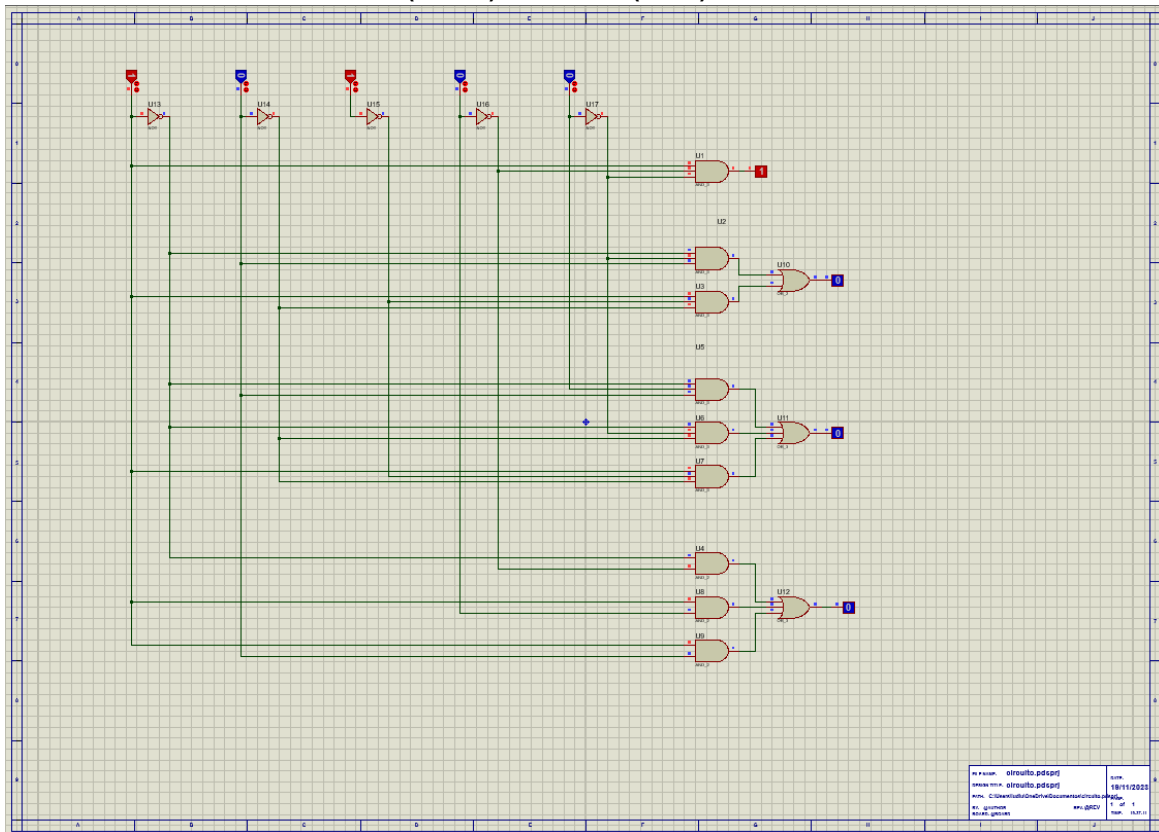
$(10001)_2$ entre 5 - $(0110)_{BCD}$



$(10010)_2$ entre 5 - $(0111)_{BCD}$



(10100)2 entre 5 - (1000)BCD



(11000)2 entre 5 - (1001)BCD

