

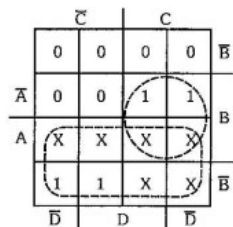
Lista 7 – Circuitos Combinacionais

1 – Elabora um decodificador BCD 8421 para o padrão 2 entre 5

Agimos de maneira análoga aos exemplos anteriores, montando primeiramente a tabela da verdade:

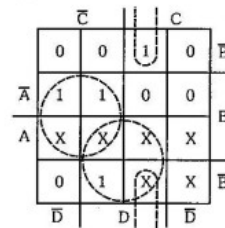
BCD 8421				2 entre 5				
A	B	C	D	S ₄	S ₃	S ₂	S ₁	S ₀
0	0	0	0	0	0	0	1	1
0	0	0	1	0	0	1	0	1
0	0	1	0	0	0	1	1	0
0	0	1	1	0	1	0	0	1
0	1	0	0	0	1	0	1	0
0	1	0	1	0	1	1	0	0
0	1	1	0	1	0	0	0	1
0	1	1	1	1	0	0	1	0
1	0	0	0	1	0	1	0	0
1	0	0	1	1	1	0	0	0

S₄:



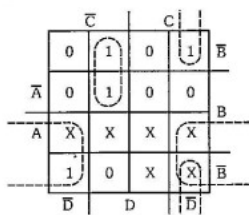
(a) $S_4 = A + BC$

S₃:



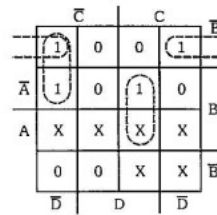
(b) $S_3 = BC\bar{C} + AD + \bar{B}CD$

S₂:



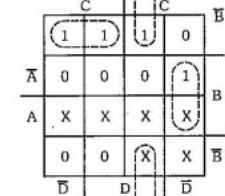
(c) $S_2 = A\bar{D} + \bar{B}C\bar{D} + \bar{A}CD$

S₁:

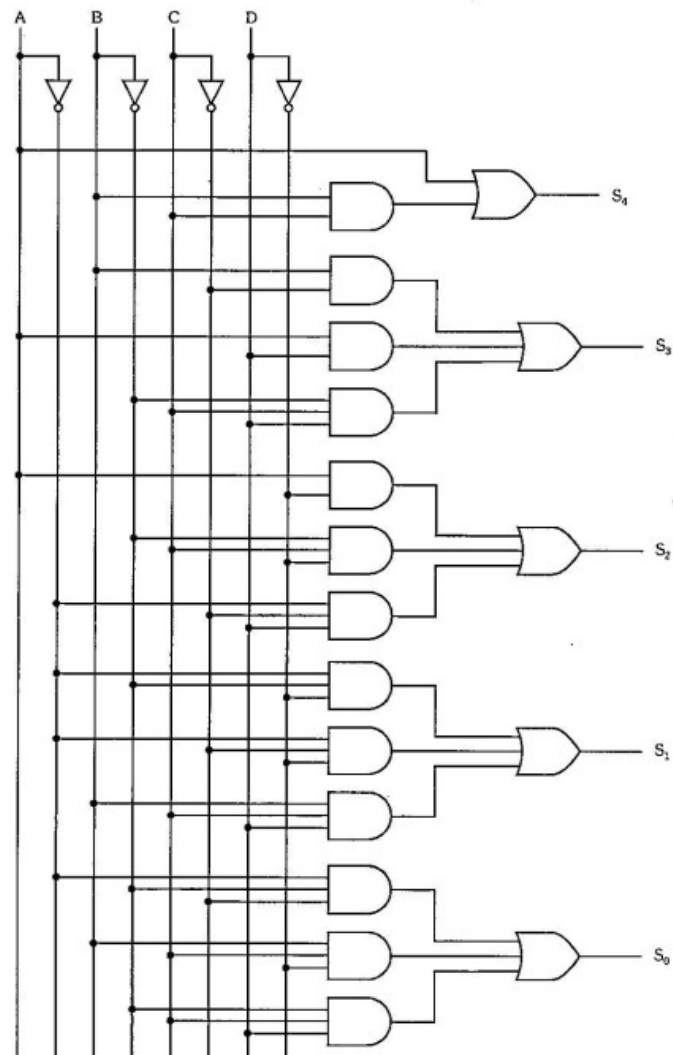


(d) $S_1 = \bar{A}BD + \bar{A}CD + BCD$

S₀:



(e) $S_0 = \bar{A}\bar{B}\bar{C} + BCD + \bar{B}CD$



2 – Projete um decodificador que transforme do código Gray para o sistema binário:

Código Gray				Binário			
A	B	C	D	S ₃	S ₂	S ₁	S ₀
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	1	0	0	1	0
0	0	1	0	0	0	1	1
0	1	1	0	0	1	0	0
0	1	1	1	0	1	0	1
0	1	0	1	0	1	1	0
0	1	0	0	0	1	1	1
1	1	0	0	1	0	0	0
1	1	0	1	1	0	0	1
1	1	1	1	1	0	1	0
1	1	1	0	1	0	1	1
1	0	1	0	1	1	0	0
1	0	1	1	1	1	0	1
1	0	0	1	1	1	1	0
1	0	0	0	1	1	1	1

S₀:

	$\bar{C}$	C	
$\bar{A}$	0	1	0
A	1	0	1
$\bar{B}$	1	0	1
B	0	1	0

Figura 5.26

$$S_0 = A \oplus B \oplus C \oplus D$$

S₃:

	$\bar{C}$	C	
$\bar{A}$	0	0	0
A	1	1	1
$\bar{B}$	1	1	1
B	0	0	0

$$(a) S_3 = A$$

S₂:

	$\bar{C}$	C	
$\bar{A}$	1	1	1
A	0	0	0
$\bar{B}$	1	1	1
B	0	0	0

$$(b) S_2 = \bar{A}B + A\bar{B} \\ \text{ou } S_2 = A \oplus B$$

Figura 5.24

S₁:

	$\bar{C}$	C	
$\bar{A}$	1	1	0
A	0	0	1
$\bar{B}$	1	1	0
B	0	0	1

$$S_1 = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$$

Figura 5.25

Fatorando a expressão, temos: $S_1 = \bar{A}(\bar{B}C + B\bar{C}) + A(\bar{B}C + B\bar{C})$

Lembrando que: $\bar{X}Y + X\bar{Y} = X \oplus Y$, podemos escrever:

$$S_1 = \bar{A}X + A\bar{X} = A \oplus X \quad \therefore S_1 = A \oplus B \oplus C$$

