Lista 2 Sistemas digitais

(1)

a. $f(A,B,C) = A.B.(\bar{B}+C) + A.\bar{C} + B$

Usando a Tabela verdade Tem-se que

A B C	A.B.($\bar{B}$+C)	f	
0 0 0	0	0	
0 0 1	0	0	
0 1 0	0	1	— $\bar{A}.B.\bar{C}$
0 1 1	0	1	— $\bar{A}.B.C$
1 0 0	0	0	
1 0 1	0	1	— $A.\bar{B}.C$
1 1 0	0	1	— $A.B.\bar{C}$
1 1 1	1	1	— $A.B.C$

$f_{SP} = \bar{A}.B.\bar{C} + \bar{A}.B.C + A.\bar{B}.C + A.B.\bar{C} + A.B.C$

b. $f(A,B,C,D) = A + B + \bar{A}.D + \overline{A.B}$

A B C D	f
0 0 0 0	1
0 0 0 1	1
0 0 1 0	1
0 0 1 1	1
0 1 0 0	1
0 1 0 1	1
0 1 1 0	1
0 1 1 1	1

A B C D	f
1 0 0 0	1
1 0 0 1	1
1 0 1 0	1
1 0 1 1	1
1 1 0 0	1
1 1 0 1	1
1 1 1 0	1
1 1 1 1	1

TAUTOLOGIA

a. $f(A,B,C,D) = A.B.C + \overline{A.C}.B + D$

A B C D	f	
0 0 0 0	0	
0 0 0 1	1	$\bar{A}.\bar{B}.\bar{C}.D$
0 0 1 0	0	
0 0 1 1	1	$\bar{A}.\bar{B}.C.D$
0 1 0 0	1	$\bar{A}.B.\bar{C}.\bar{D}$
0 1 0 1	1	$\bar{A}.B.\bar{C}.D$
0 1 1 0	1	$\bar{A}.B.C.\bar{D}$
0 1 1 1	1	$\bar{A}.\bar{B}.C.D$

A B C D	f	
1 0 0 0	0	
1 0 0 1	1	$A.\bar{B}.\bar{C}.D$
1 0 1 0	0	
1 0 1 1	1	$A.\bar{B}.C.D$
1 1 0 0	1	$A.B.\bar{C}.\bar{D}$
1 1 0 1	1	$A.B.\bar{C}.D$
1 1 1 0	1	$A.B.C.\bar{D}$
1 1 1 1	1	$A.B.C.D$

$$f_{SP} = \bar{A}.\bar{B}.\bar{C}.D + \bar{A}.\bar{B}.C.D + \bar{A}.B.\bar{C}.\bar{D} +$$
$$+ \bar{A}.B.\bar{C}.D + \bar{A}.B.C.\bar{D} + \bar{A}.B.C.D +$$
$$+ A.\bar{B}.\bar{C}.D + A.\bar{B}.C.D + A.B.\bar{C}.\bar{D} +$$
$$+ A.B.\bar{C}.D + A.B.C.\bar{D} + A.B.C.D$$

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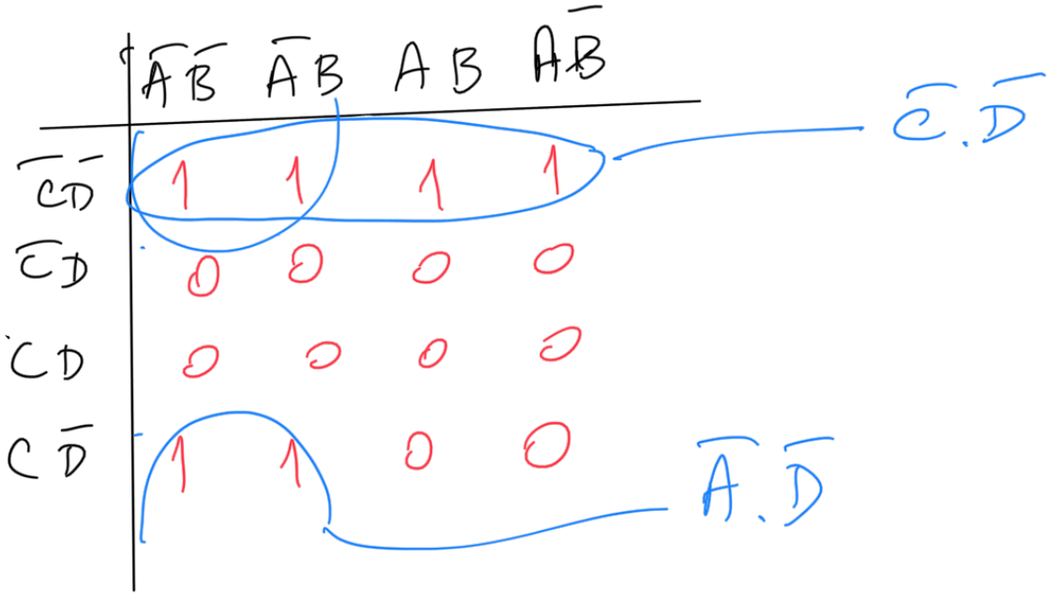
(2) A, B, C, D

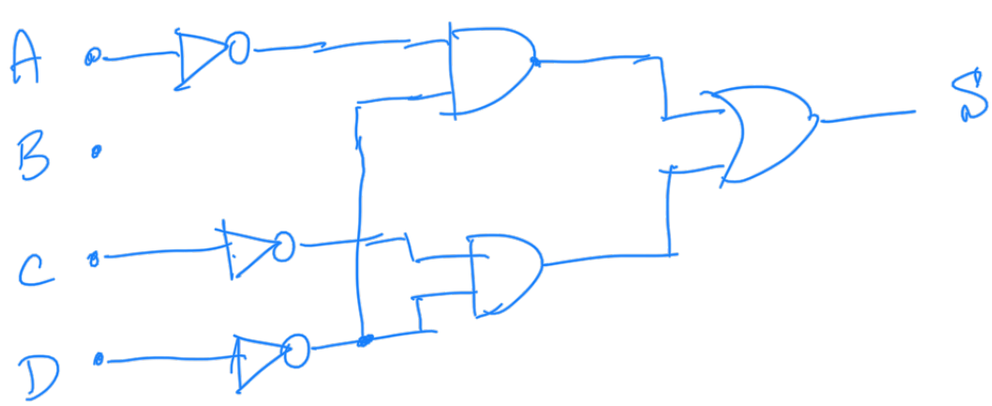
- V(A)=1, máquina A para de funcionar
- V(B)=1, máquina B para de funcionar
- V(C)=1, máquina C para de funcionar
- V(D)=1, máquina D para de funcionar

$S = f(A, B, C, D) = 1$, linha para de funcionar

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

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

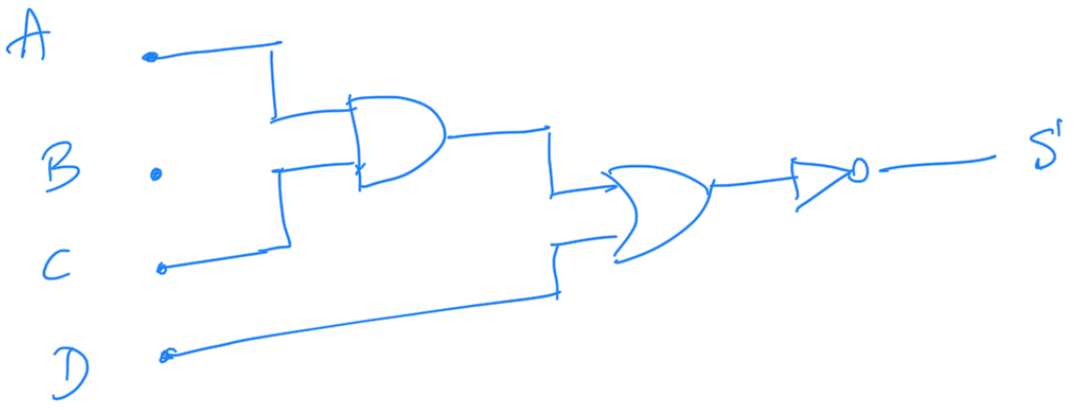




OUTRA SOLUÇÃO S/ USO DA TABELA

$S' = 0$, $A.C + D$ $\Rightarrow$

$S' = 1$, $\overline{A.C + D}$



(3)

S_1 :: TROCO 3 x R$ 1,00
1 x R$ 0,50
1 x R$ 0.25

$S_1(A,B,C) = 1$, $A + B$

S'_2 :: TROCO 2 x R$ 1,00
1 x R$0.50
1 x R$0,25

$S_2(A,B,C) = 1$, $A.B + A.C + C$,
$A.B + C$

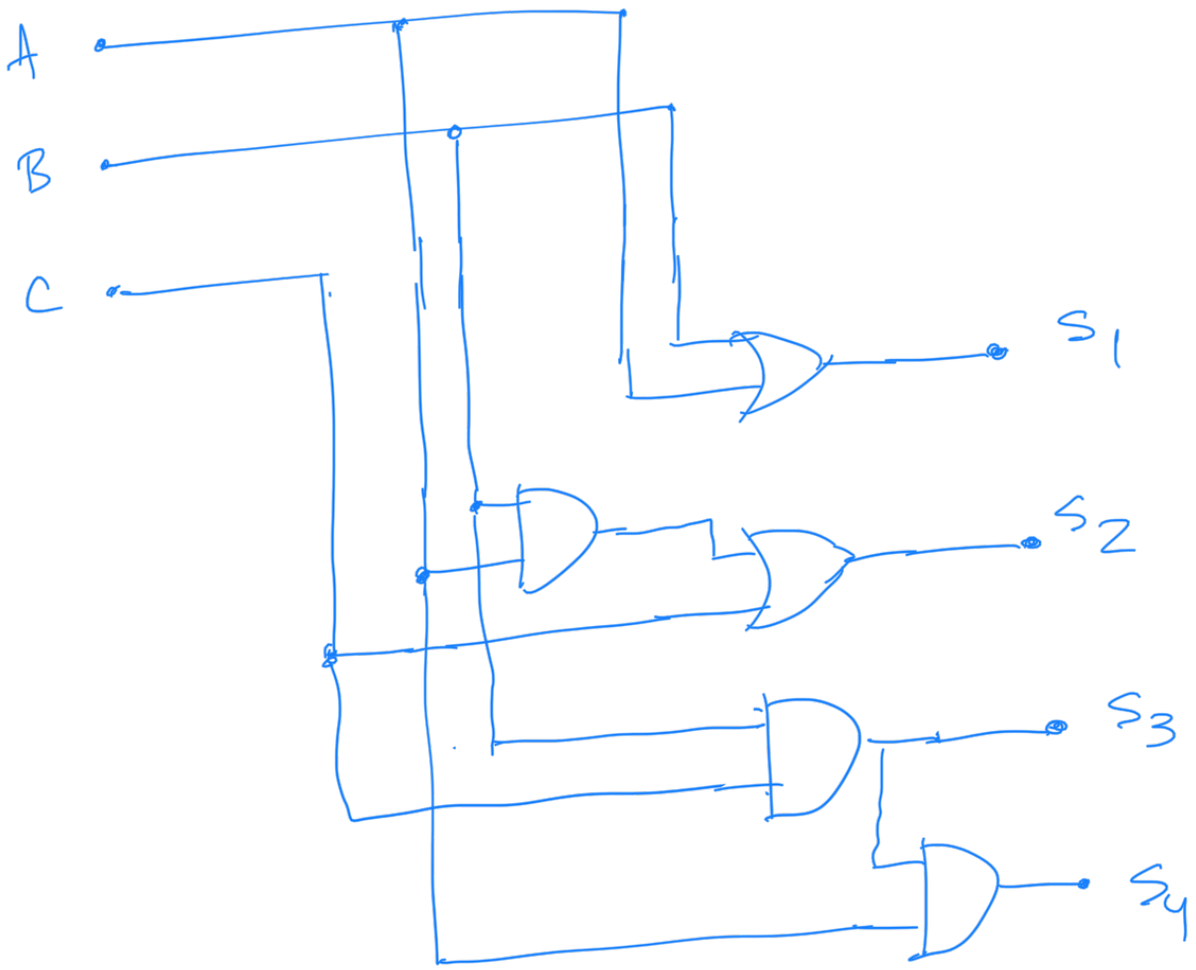
S_3 ∴ TROCO 3 × R$ 1,00
1 × R$ 0.25

$S_3(A,B,C) = 1, \; B.C$

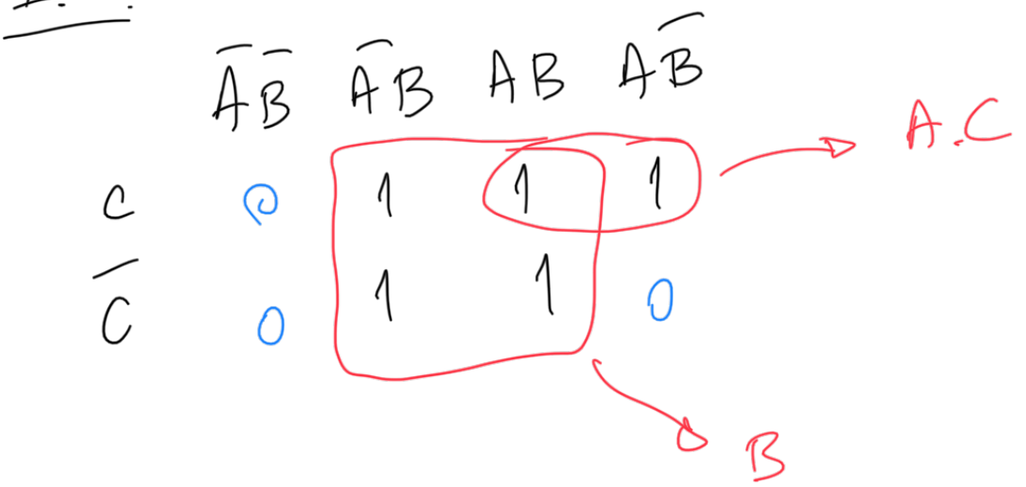
S_4 ∴ TROCO 2 × R$ 1,00

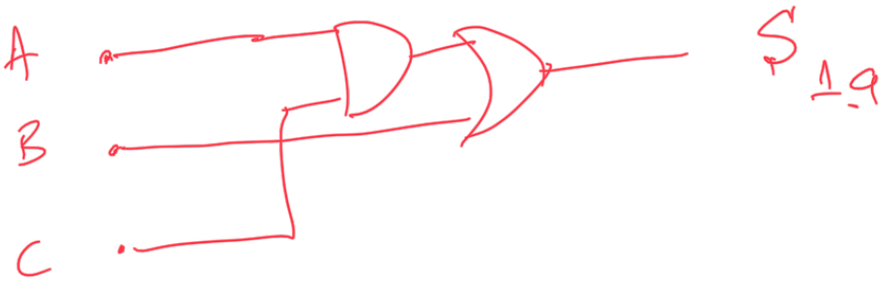
$S_4(A,B,C) = 1, \; A.B.C$

CIRCUITO DE CONTROLE

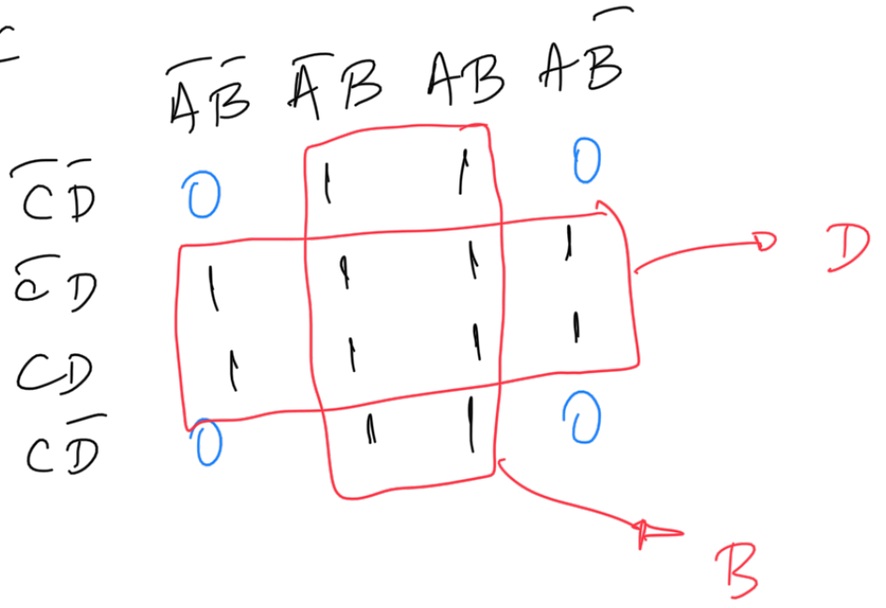


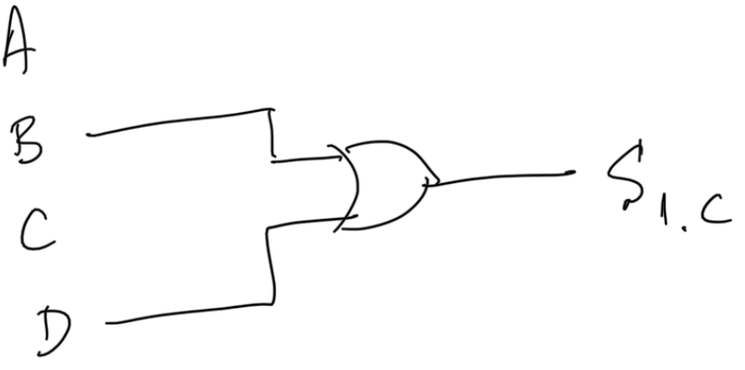
(4) 1.a.


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


A
B
C
$S_{1.a}$

1.c

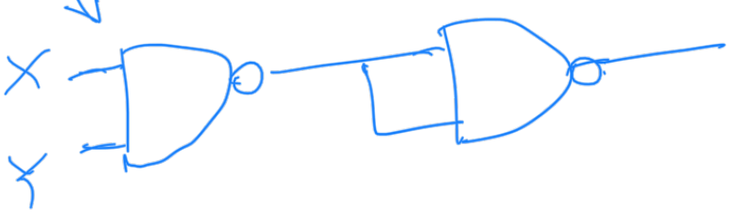

$\bar{A}\bar{B}$ $\bar{A}B$ AB $A\bar{B}$
$\bar{C}\bar{D}$
$\bar{C}D$
CD
$C\bar{D}$
0 1 1 0
1 1 1 1
1 1 1 1
0 1 1 0
D
B


A
B
C
D
$S_{1.c}$

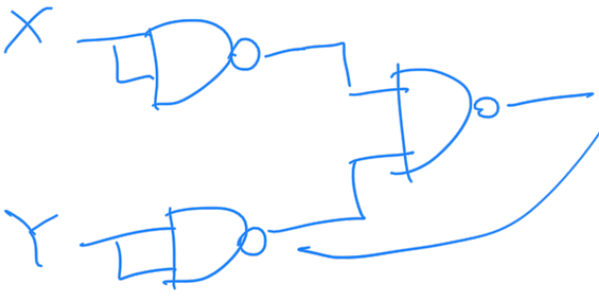
(5)

$$\bar{X} = \overline{X \cdot X}$$

$$X \cdot Y = \overline{\overline{X \cdot Y} \cdot \overline{X \cdot Y}}$$



$$X + Y = \overline{\overline{X + Y}} = \overline{\bar{X} \cdot \bar{Y}}$$



Fazer as substituições