CIRCUITOS DIGITAIS

DECODIFICADORES

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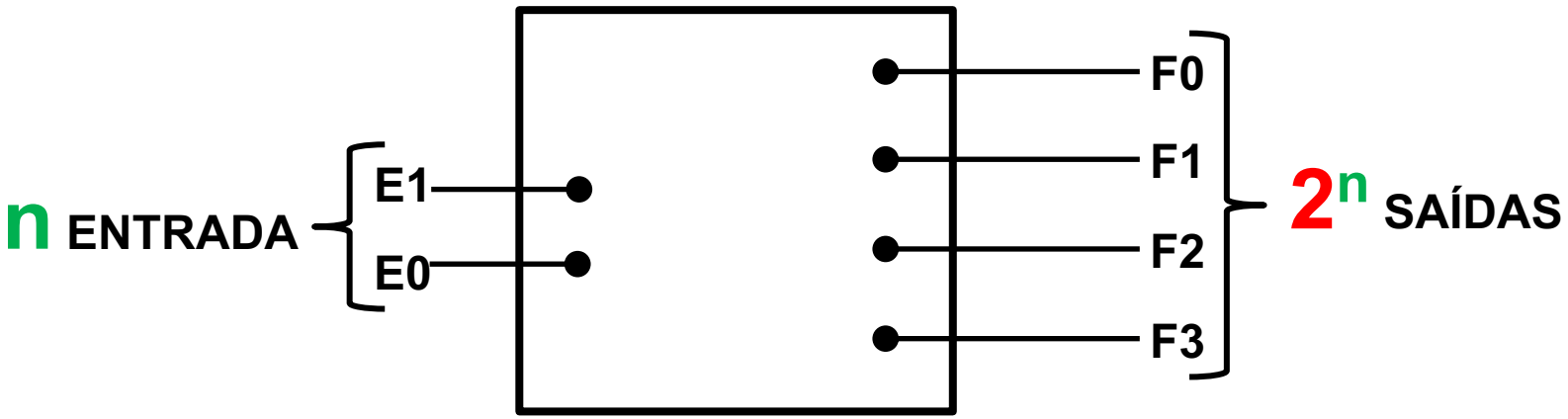
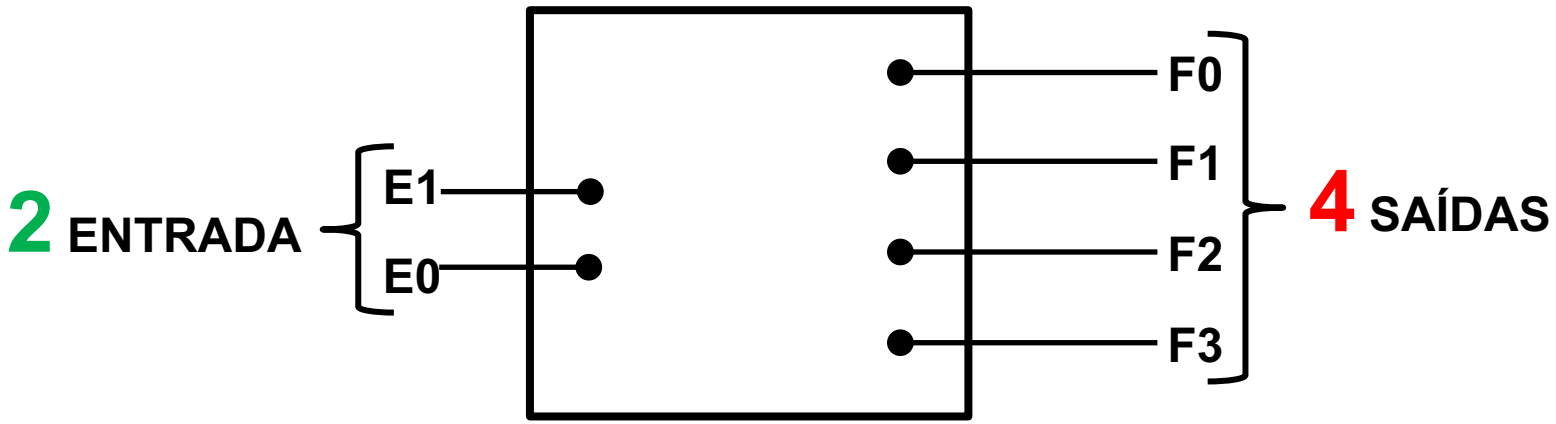
Decodificadores

- Função inversa do codificador
- A informação contida em um vetor binário é repassada a um vetor maior onde apenas um bit será ativado



Decodificadores

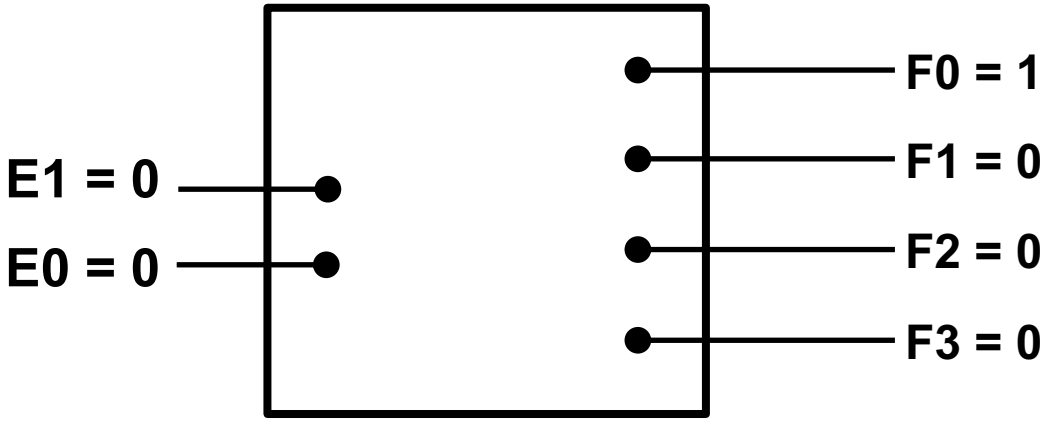
- Decodificador **2:4**



Decodificadores

- Decodificador **2:4**

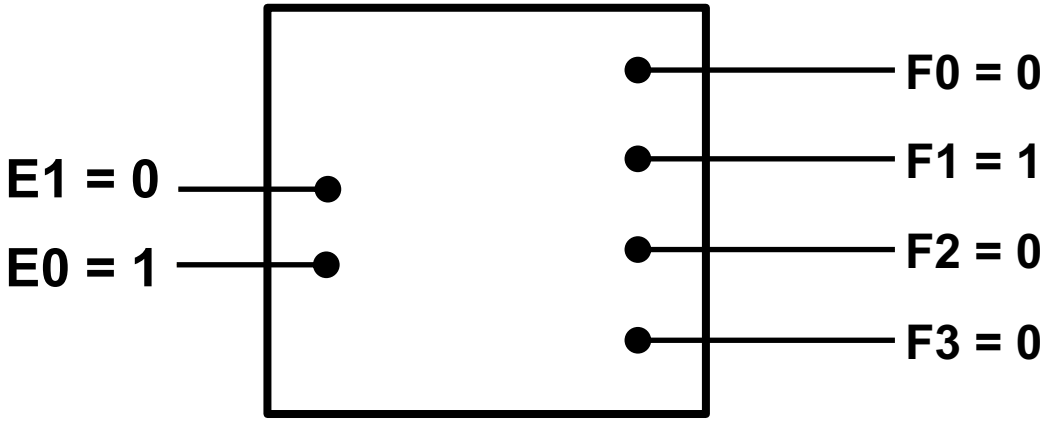
E1	E0	F0	F1	F2	F3
0	0	**1**	**0**	**0**	**0**
0	1	**0**	**1**	**0**	**0**
1	0	**0**	**0**	**1**	**0**
1	1	**0**	**0**	**0**	**1**



Decodificadores

- Decodificador **2:4**

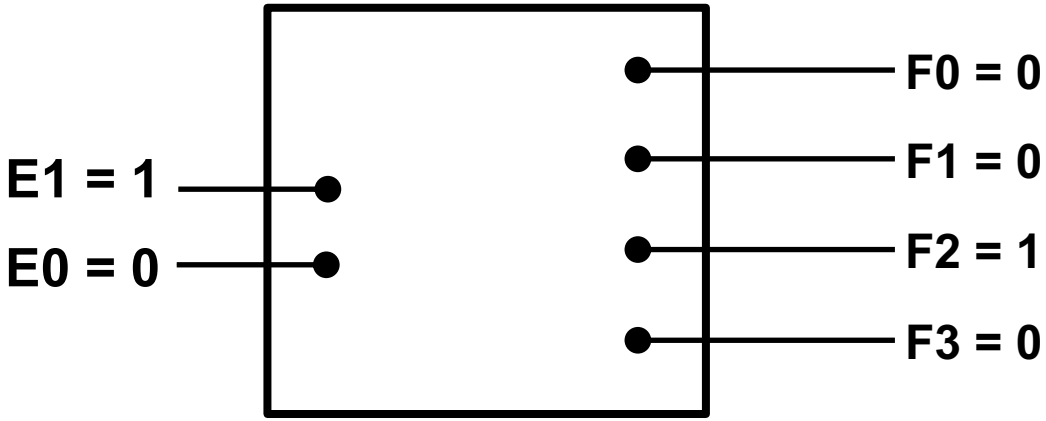
E1	E0	F0	F1	F2	F3
0	0	**1**	**0**	**0**	**0**
0	1	**0**	**1**	**0**	**0**
1	0	**0**	**0**	**1**	**0**
1	1	**0**	**0**	**0**	**1**



Decodificadores

- Decodificador **2:4**

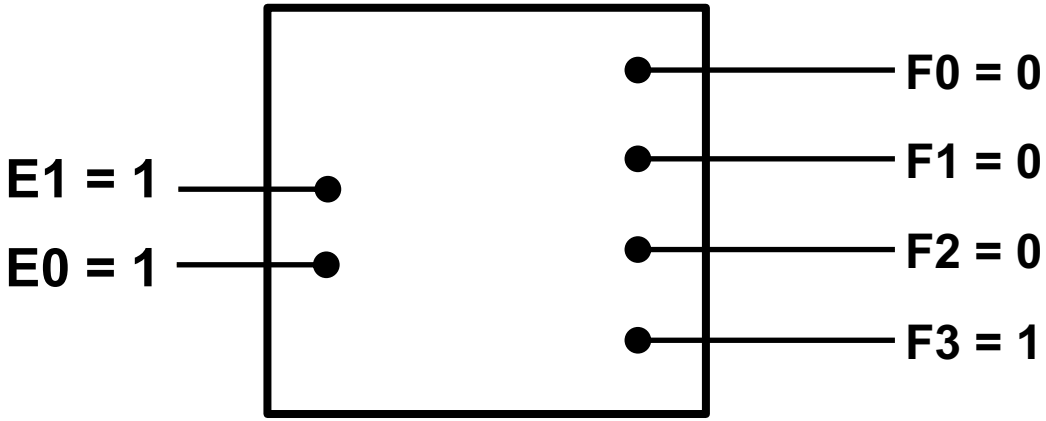
E1	E0	F0	F1	F2	F3
0	0	**1**	**0**	**0**	**0**
0	1	**0**	**1**	**0**	**0**
1	0	**0**	**0**	**1**	**0**
1	1	**0**	**0**	**0**	**1**



Decodificadores

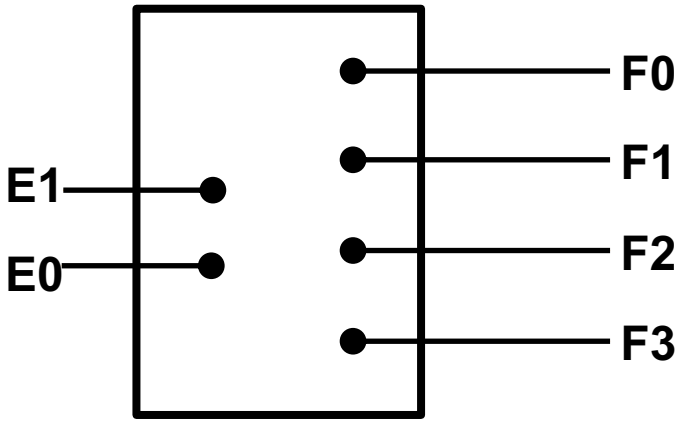
- Decodificador **2:4**

E1	E0	F0	F1	F2	F3
0	0	**1**	**0**	**0**	**0**
0	1	**0**	**1**	**0**	**0**
1	0	**0**	**0**	**1**	**0**
1	1	**0**	**0**	**0**	**1**



Decodificadores

- Decodificador **2:4**



E1	E0	F0	F1	F2	F3
0	0	**1**	**0**	**0**	**0**
0	1	**0**	**1**	**0**	**0**
1	0	**0**	**0**	**1**	**0**
1	1	**0**	**0**	**0**	**1**

$$F0 = \overline{E1}\,\overline{E0}$$

$$F1 = \overline{E1}\,E0$$

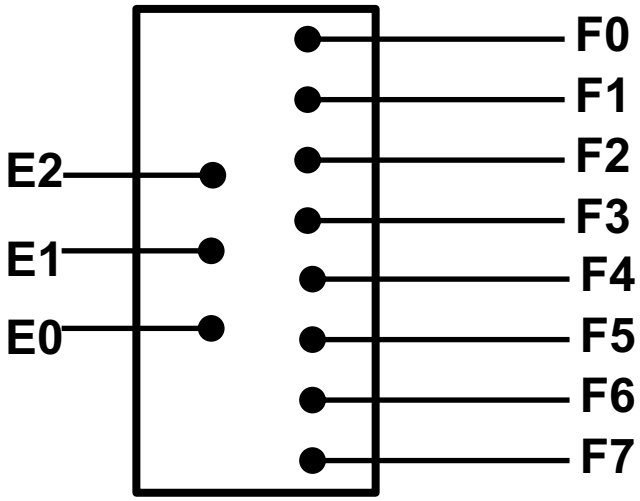
$$F2 = E1\overline{E0}$$

$$F3 = E1E0$$

- **saída → mintermo**

Decodificadores

- Decodificador **3:8**

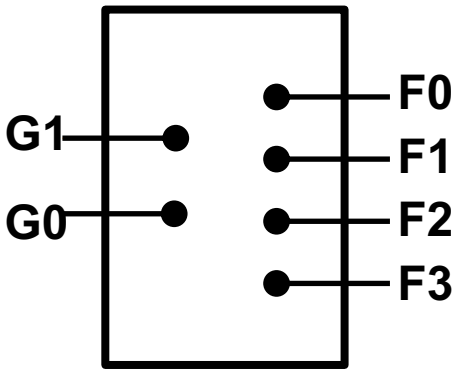


E2	E1	E0	F0	F1	F2	F3	F4	F5	F6	F7
0	0	0	**1**	0	0	0	0	0	0	0
0	0	1	0	**1**	0	0	0	0	0	0
0	1	0	0	0	**1**	0	0	0	0	0
0	1	1	0	0	0	**1**	0	0	0	0
1	0	0	0	0	0	0	**1**	0	0	0
1	0	1	0	0	0	0	0	**1**	0	0
1	1	0	0	0	0	0	0	0	**1**	0
1	1	1	0	0	0	0	0	0	0	**1**

$$F0 = \overline{E2}\,\overline{E1}\,\overline{E0} \qquad F2 = \overline{E2}E1\overline{E0} \qquad F1 = \overline{E2}\,\overline{E1}\,E0 \qquad F3 = \overline{E2}E1E0$$

$$F4 = E2\overline{E1}\,\overline{E0} \qquad F6 = E2E1\overline{E0} \qquad F5 = E2\overline{E1}\,E0 \qquad F7 = E2E1E0$$

Decodificador Gray para Decimal



G1	G0	F0	F1	F2	F3
0	0	1	0	0	0
0	1	0	1	0	0
1	1	0	0	1	0
1	0	0	0	0	1

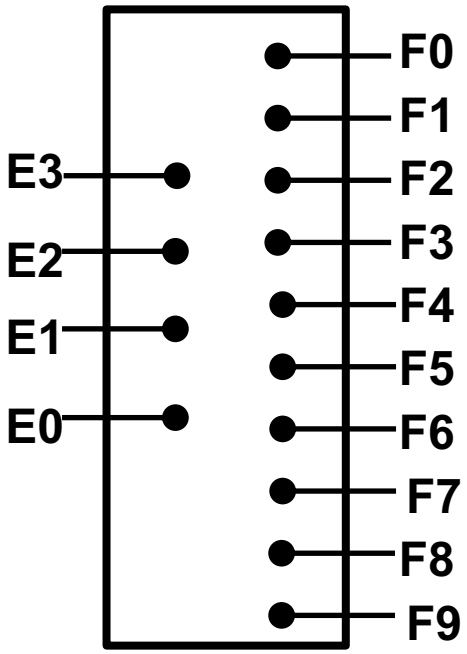
$$F0 = \overline{G1}\,\overline{G0}$$

$$F1 = \overline{G1}\,G0$$

$$F2 = G1G0$$

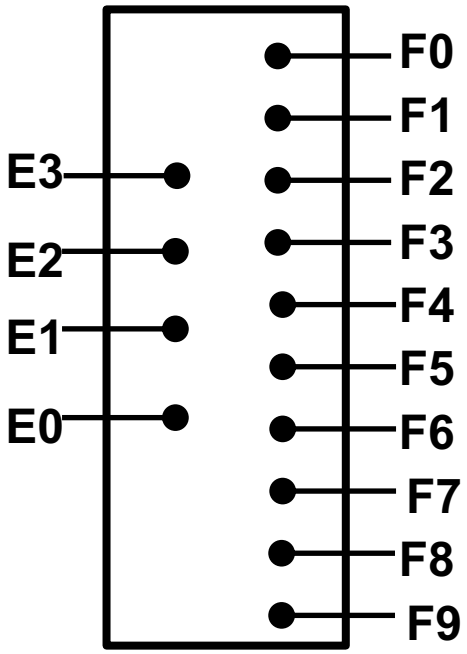
$$F3 = G1\overline{G0}$$

Decodificador BCD para Decimal



E3	E2	E1	E0	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9
0	0	0	0	**1**	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	0	0	**1**	0	0	0	0	0	0	0
0	0	1	1	0	0	0	**1**	0	0	0	0	0	0
0	1	0	0	0	0	0	0	**1**	0	0	0	0	0
0	1	0	1	0	0	0	0	0	**1**	0	0	0	0
0	1	1	0	0	0	0	0	0	0	**1**	0	0	0
0	1	1	1	0	0	0	0	0	0	0	**1**	0	0
1	0	0	0	0	0	0	0	0	0	0	0	**1**	0
1	0	0	1	0	0	0	0	0	0	0	0	0	**1**
1	0	1	0	X	X	X	X	X	X	X	X	X	X
1	0	1	1	X	X	X	X	X	X	X	X	X	X
1	1	0	0	X	X	X	X	X	X	X	X	X	X
1	1	0	1	X	X	X	X	X	X	X	X	X	X
1	1	1	0	X	X	X	X	X	X	X	X	X	X
1	1	1	1	X	X	X	X	X	X	X	X	X	X

Decodificador BCD para Decimal



E3	E2	E1	E0	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9
0	0	0	0	**1**	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	0	0	**1**	0	0	0	0	0	0	0
0	0	1	1	0	0	0	**1**	0	0	0	0	0	0
0	1	0	0	0	0	0	0	**1**	0	0	0	0	0
0	1	0	1	0	0	0	0	0	**1**	0	0	0	0
0	1	1	0	0	0	0	0	0	0	**1**	0	0	0
0	1	1	1	0	0	0	0	0	0	0	**1**	0	0
1	0	0	0	0	0	0	0	0	0	0	0	**1**	0
1	0	0	1	0	0	0	0	0	0	0	0	0	**1**

$$F0 = \overline{E3}\,\overline{E2}\,\overline{E1}\,\overline{E0} \qquad F1 = \overline{E3}\,\overline{E2}\,\overline{E1}\,E0 \qquad F2 = \overline{E3}\,\overline{E2}E1\overline{E0}$$

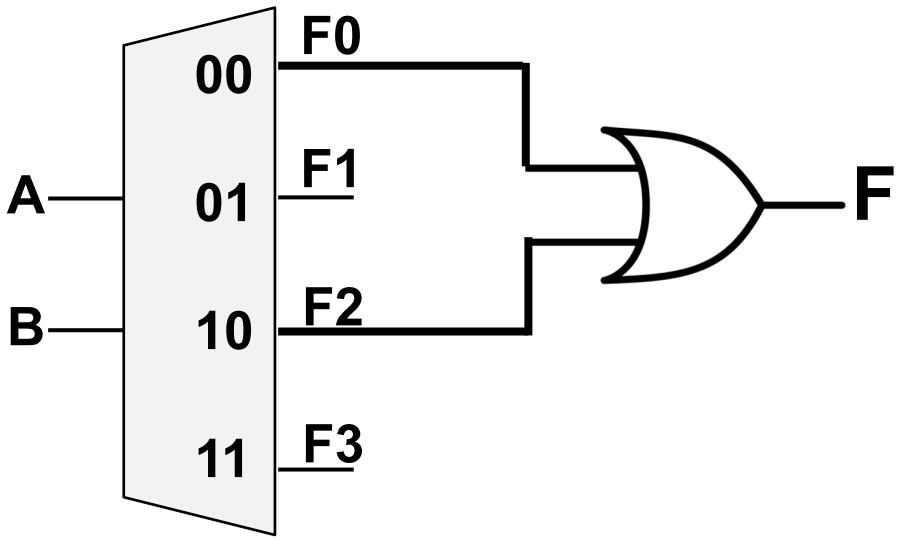
$$F3 = \overline{E3}\,\overline{E2}E1E0 \qquad F4 = \overline{E3}E2\overline{E1}\,\overline{E0} \qquad F5 = \overline{E3}E2\overline{E1}\,E0$$

$$F6 = \overline{E3}E2E1\overline{E0} \qquad F7 = \overline{E3}E2E1E0 \qquad F8 = E3\overline{E2}\,\overline{E1}\,\overline{E0}$$

$$F9 = E3\overline{E2}\,\overline{E1}E0$$

Funções booleanas com DECOD

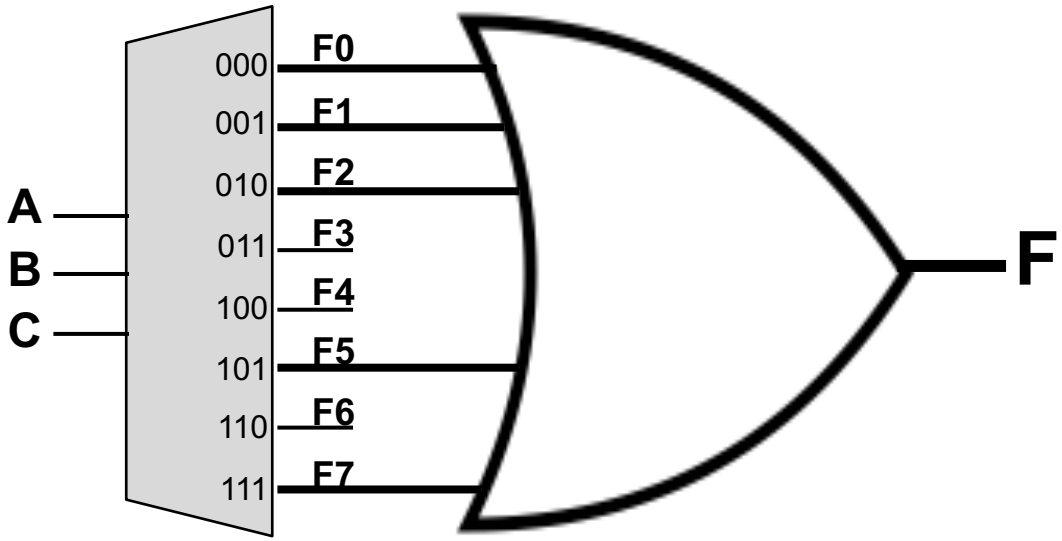
- **EXEMPLO:** $F(A,B) = \sum m(0,2)$



$$F(A,B) = F0 + F2$$

Funções booleanas com DECOD

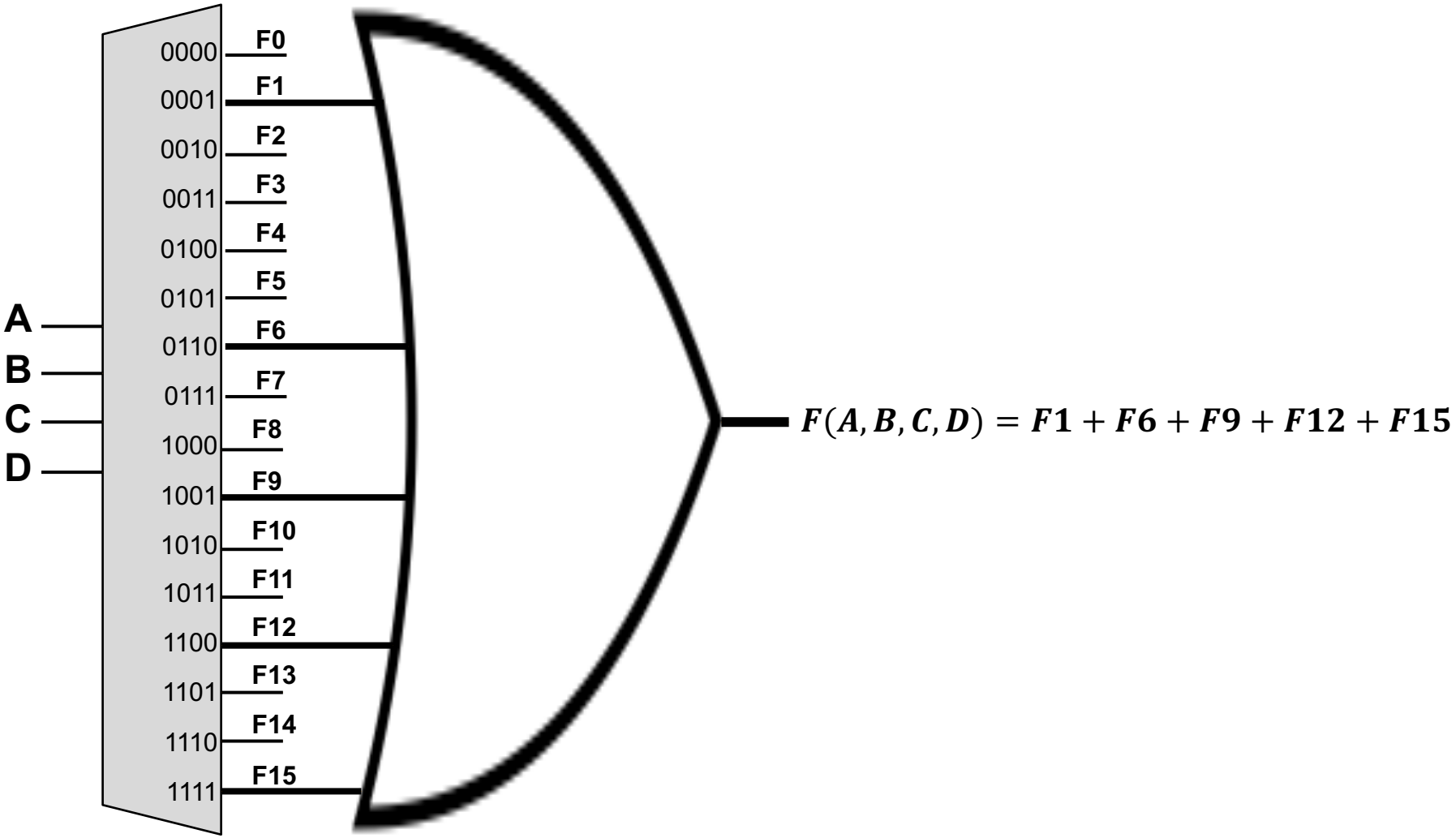
- **EXEMPLO:** $F(A,B,C) = \sum m(0,1,2,5,7)$



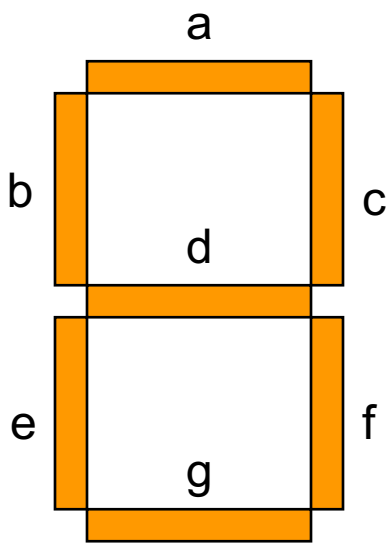
$$F(A,B,C) = F0 + F1 + F2 + F5 + F7$$

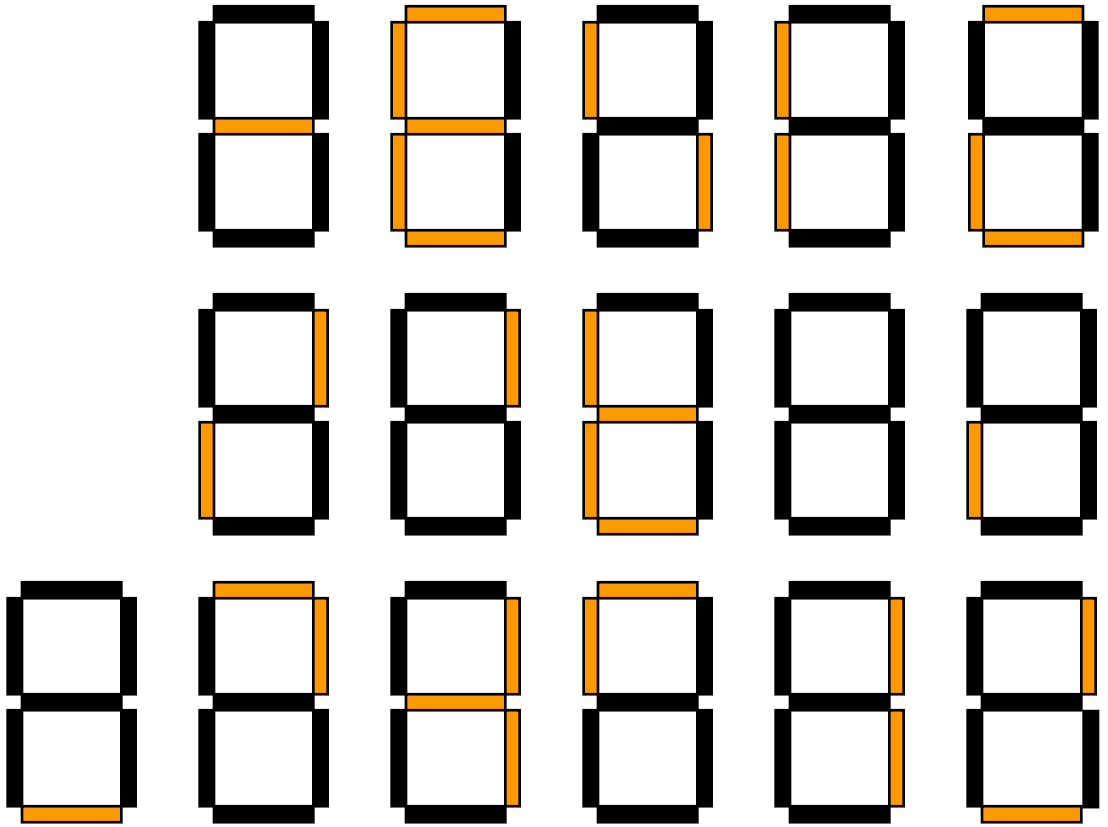
Funções booleanas com DECOD

- **EXEMPLO:** $F(A,B,C,D) = \sum m(1,6,9,12,15)$

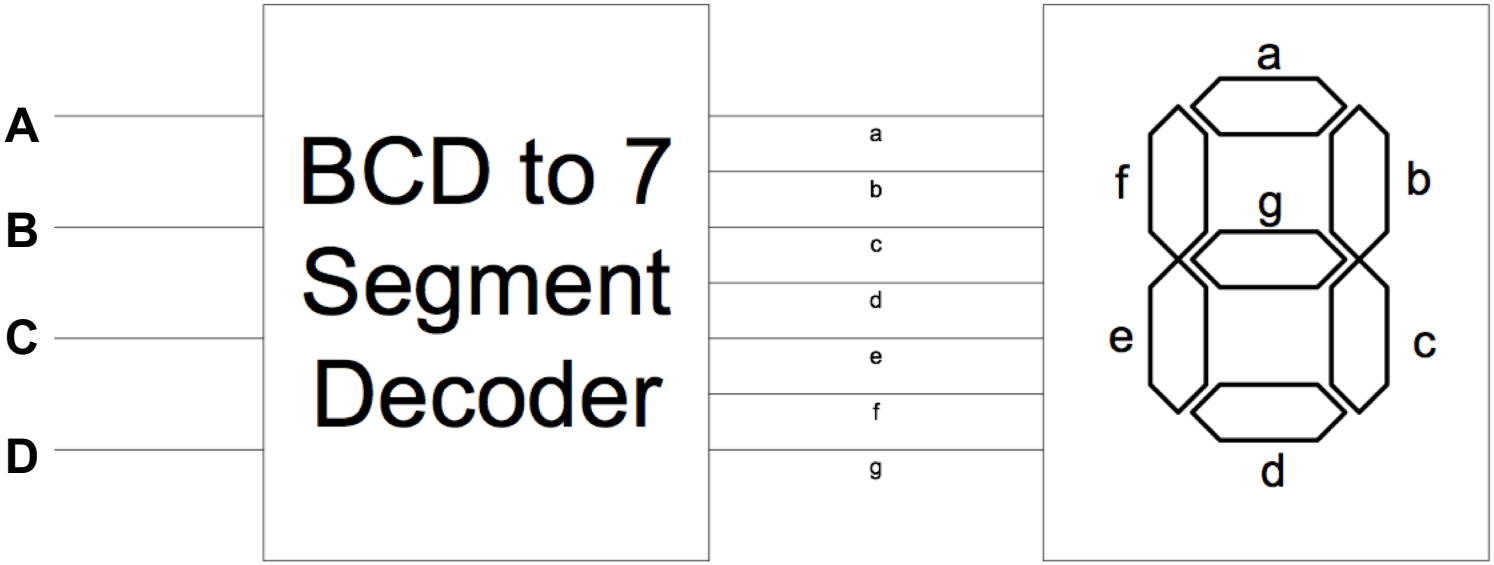


Display de 7 segmentos





Decodificador BCD/display de 7 seg.



Números possíveis e sua representação em display de 7 segmentos

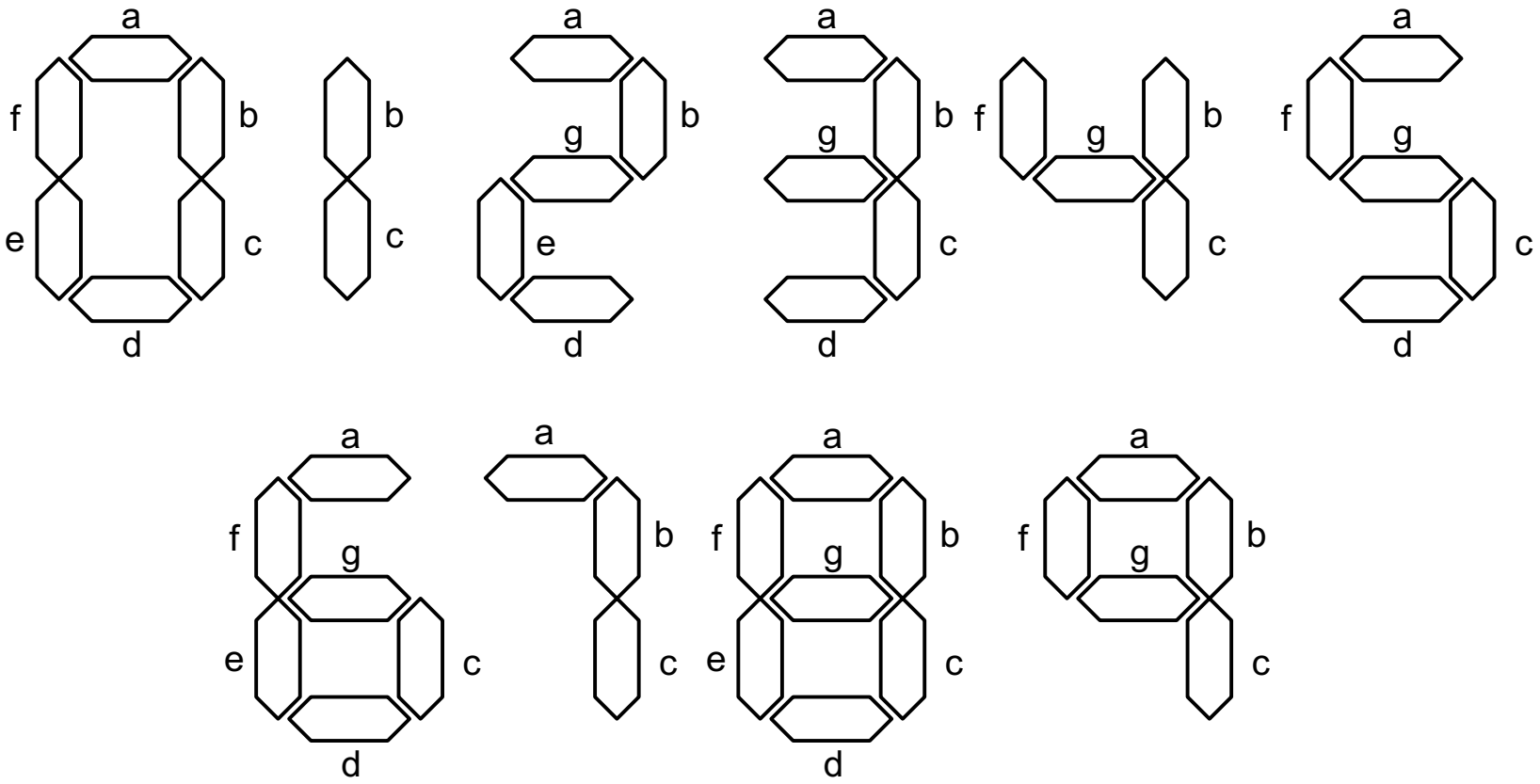
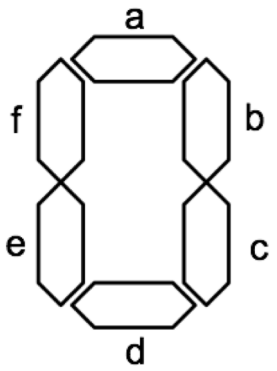
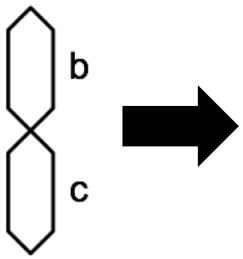


Tabela Verdade



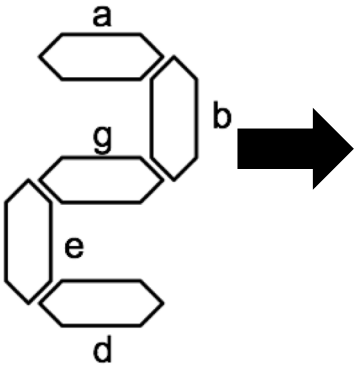
A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1							
0	0	1	0							
0	0	1	1							
0	1	0	0							
0	1	0	1							
0	1	1	0							
0	1	1	1							
1	0	0	0							
1	0	0	1							

Tabela Verdade



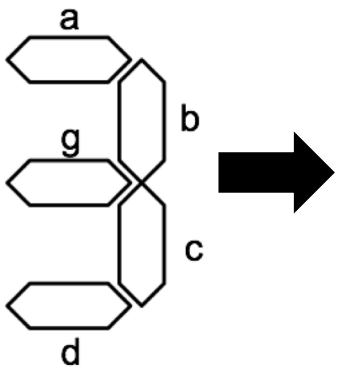
A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0							
0	0	1	1							
0	1	0	0							
0	1	0	1							
0	1	1	0							
0	1	1	1							
1	0	0	0							
1	0	0	1							

Tabela Verdade



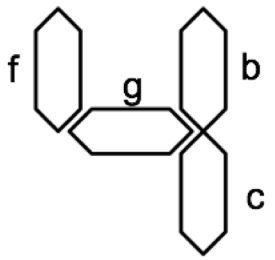
A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1							
0	1	0	0							
0	1	0	1							
0	1	1	0							
0	1	1	1							
1	0	0	0							
1	0	0	1							

Tabela Verdade



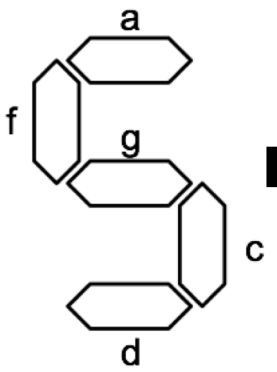
A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
0	1	0	0							
0	1	0	1							
0	1	1	0							
0	1	1	1							
1	0	0	0							
1	0	0	1							

Tabela Verdade



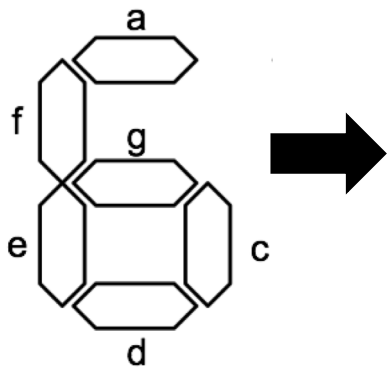
A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
0	1	0	1							
0	1	1	0							
0	1	1	1							
1	0	0	0							
1	0	0	1							

Tabela Verdade



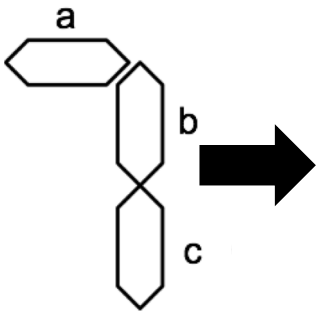
A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
0	1	0	1	**1**	**0**	**1**	**1**	**0**	**1**	**1**
0	1	1	0							
0	1	1	1							
1	0	0	0							
1	0	0	1							

Tabela Verdade



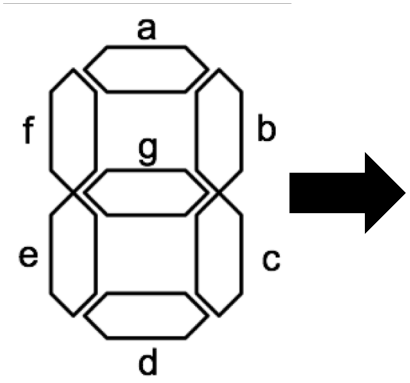
A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
0	1	0	1	**1**	**0**	**1**	**1**	**0**	**1**	**1**
0	1	1	0	**1**	**0**	**1**	**1**	**1**	**1**	**1**
0	1	1	1							
1	0	0	0							
1	0	0	1							

Tabela Verdade



A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
0	1	0	1	**1**	**0**	**1**	**1**	**0**	**1**	**1**
0	1	1	0	**1**	**0**	**1**	**1**	**1**	**1**	**1**
0	1	1	1	**1**	**1**	**1**	**0**	**0**	**0**	**0**
1	0	0	0							
1	0	0	1							

Tabela Verdade



A	B	C	D	a	b	c	d	e	f	g
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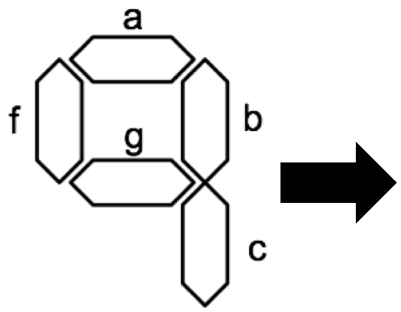
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
0	1	0	1	**1**	**0**	**1**	**1**	**0**	**1**	**1**
0	1	1	0	**1**	**0**	**1**	**1**	**1**	**1**	**1**
0	1	1	1	**1**	**1**	**1**	**0**	**0**	**0**	**0**
1	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**1**
1	0	0	1							

Tabela Verdade



A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
0	1	0	1	**1**	**0**	**1**	**1**	**0**	**1**	**1**
0	1	1	0	**1**	**0**	**1**	**1**	**1**	**1**	**1**
0	1	1	1	**1**	**1**	**1**	**0**	**0**	**0**	**0**
1	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**1**
1	0	0	1	**1**	**1**	**1**	**0**	**0**	**1**	**1**

Tabela Verdade

Decimal	A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
1	0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
2	0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
3	0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
4	0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
5	0	1	0	1	**1**	**0**	**1**	**1**	**0**	**1**	**1**
6	0	1	1	0	**1**	**0**	**1**	**1**	**1**	**1**	**1**
7	0	1	1	1	**1**	**1**	**1**	**0**	**0**	**0**	**0**
8	1	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**1**
9	1	0	0	1	**1**	**1**	**1**	**0**	**0**	**1**	**1**
	1	0	1	0	X	X	X	X	X	X	X
	1	0	1	1	X	X	X	X	X	X	X
	1	1	0	0	X	X	X	X	X	X	X
	1	1	0	1	X	X	X	X	X	X	X
	1	1	1	0	X	X	X	X	X	X	X
	1	1	1	1	X	X	X	X	X	X	X

Tabela Verdade

Decimal	A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**0**
1	0	0	0	1	**0**	**1**	**1**	**0**	**0**	**0**	**0**
2	0	0	1	0	**1**	**1**	**0**	**1**	**1**	**0**	**1**
3	0	0	1	1	**1**	**1**	**1**	**1**	**0**	**0**	**1**
4	0	1	0	0	**0**	**1**	**1**	**0**	**0**	**1**	**1**
5	0	1	0	1	**1**	**0**	**1**	**1**	**0**	**1**	**1**
6	0	1	1	0	**1**	**0**	**1**	**1**	**1**	**1**	**1**
7	0	1	1	1	**1**	**1**	**1**	**0**	**0**	**0**	**0**
8	1	0	0	0	**1**	**1**	**1**	**1**	**1**	**1**	**1**
9	1	0	0	1	**1**	**1**	**1**	**0**	**0**	**1**	**1**

$$a = \sum m(0,2,3,5,6,7,8,9)$$

$$b = \sum m(0,1,2,3,4,7,8,9)$$

$$c = \sum m(0,1,3,4,5,6,7,8,9)$$

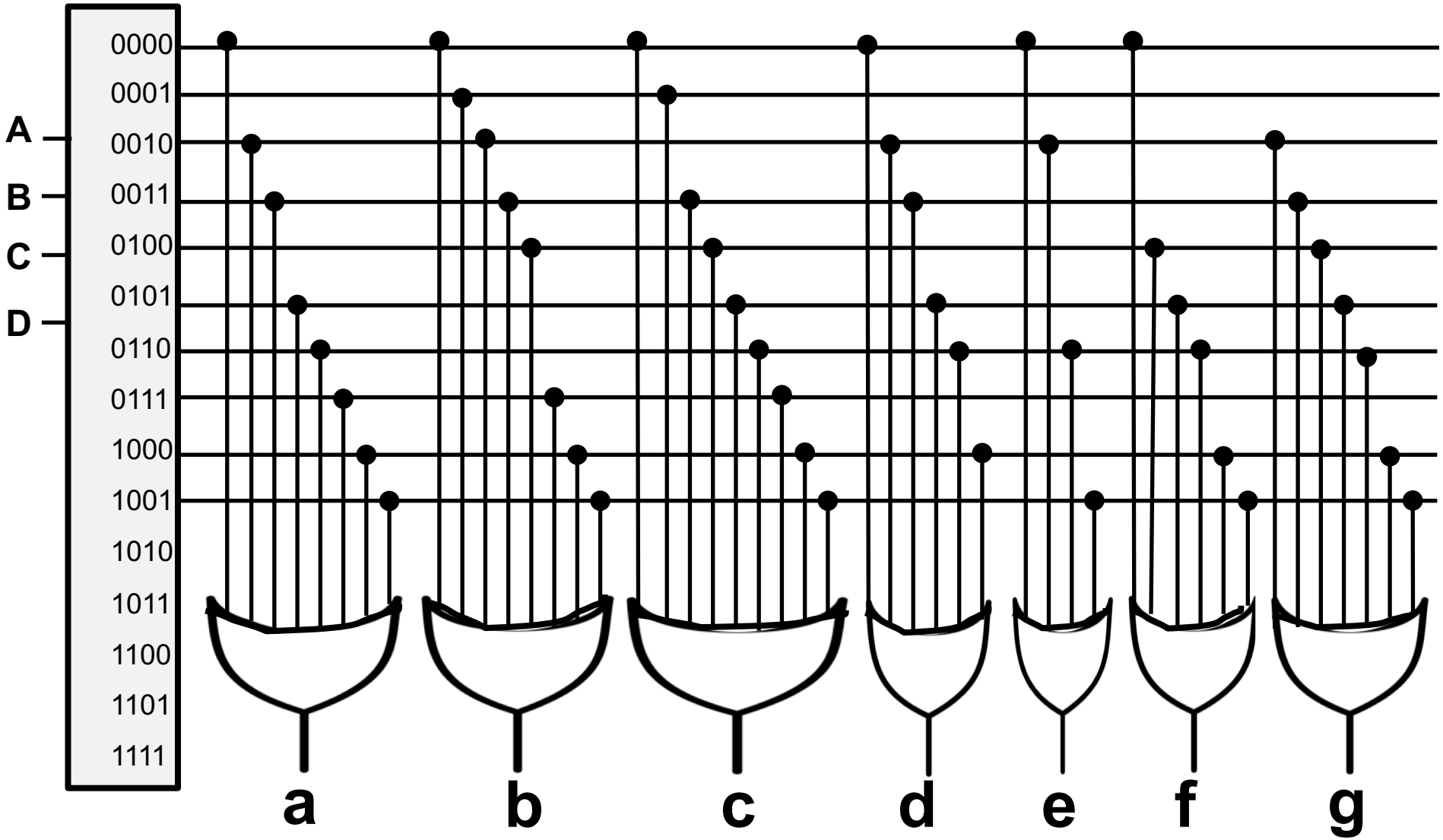
$$d = \sum m(0,2,3,5,6,8)$$

$$e = \sum m(0,2,6,8)$$

$$f = \sum m(0,4,5,6,8,9)$$

$$g = \sum m(2,3,4,5,6,8,9)$$

Circuito com DECODIFICADOR

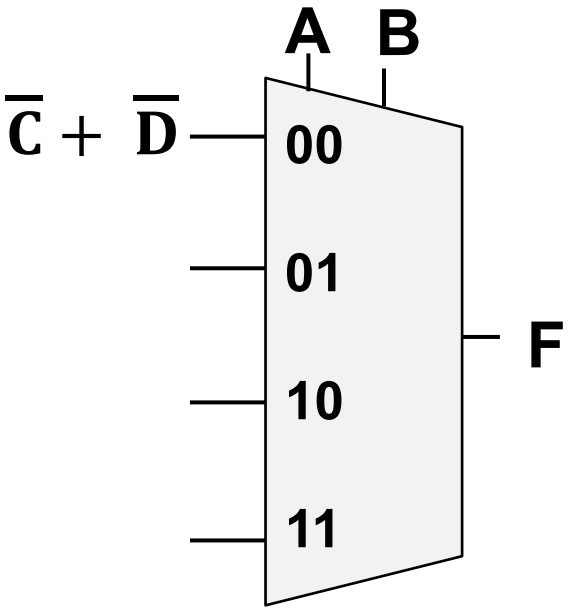


Função booleana com MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

AB \ CD	00	01	11	10
00	1 0	1 1	0 3	1 2
01	0 4	1 5	1 7	0 6
11	0 12	1 13	1 15	1 14
10	0 8	0 9	0 11	1 10

$F = \overline{C} + \overline{D}$



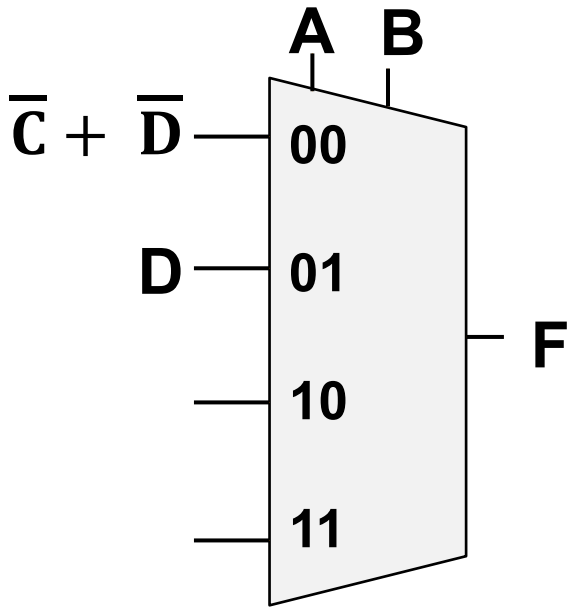
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Função booleana com MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

AB \ CD	00	01	11	10
00	1 (0)	1 (1)	0 (3)	1 (2)
01	0 (4)	1 (5)	1 (7)	0 (6)
11	0 (12)	1 (13)	1 (15)	1 (14)
10	0 (8)	0 (9)	0 (11)	1 (10)

F = D



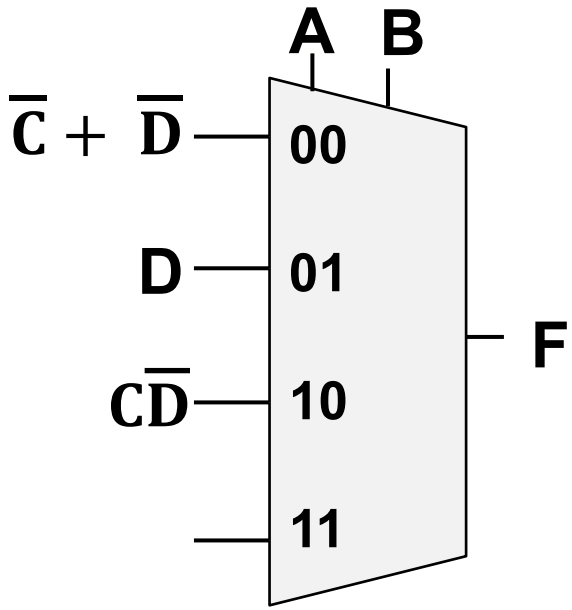
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Função booleana com MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

AB \ CD	00	01	11	10
00	1 (0)	1 (1)	0 (3)	1 (2)
01	0 (4)	1 (5)	1 (7)	0 (6)
11	0 (12)	1 (13)	1 (15)	1 (14)
10	0 (8)	0 (9)	0 (11)	1 (10)

$F = C\overline{D}$



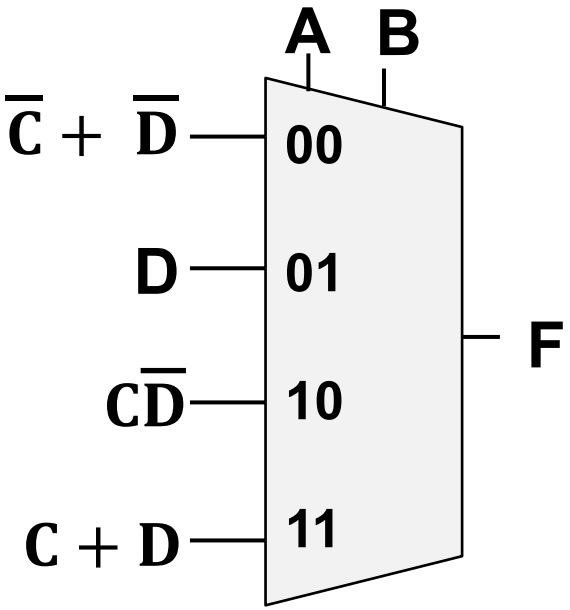
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Função booleana com MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

AB \ CD	00	01	11	10
00	1 (0)	1 (1)	0 (3)	1 (2)
01	0 (4)	1 (5)	1 (7)	0 (6)
11	0 (12)	1 (13)	1 (15)	1 (14)
10	0 (8)	0 (9)	0 (11)	1 (10)

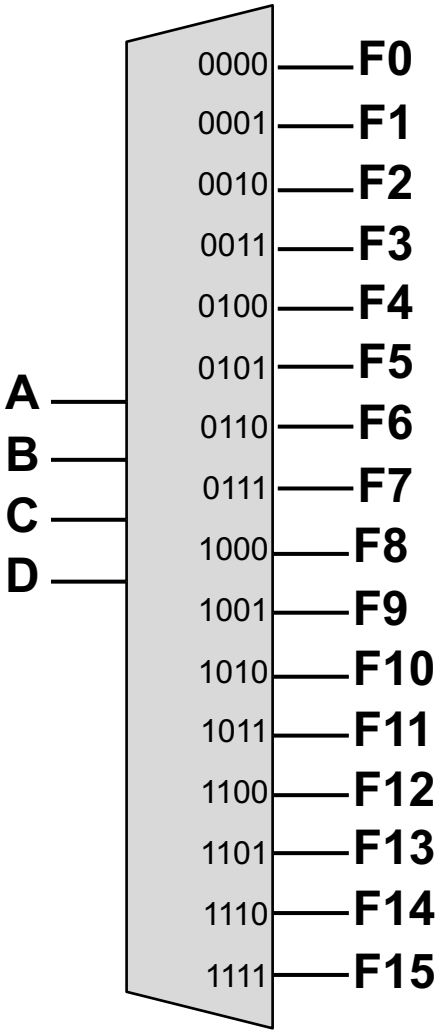
$F = C + D$



→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Função booleana com DECOD 4:16

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$



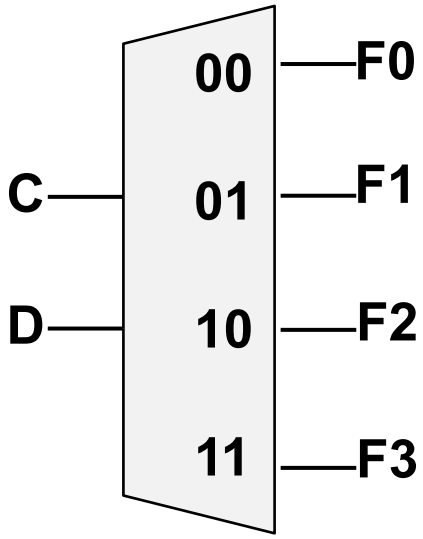
COM DECODIFICADOR 4:16

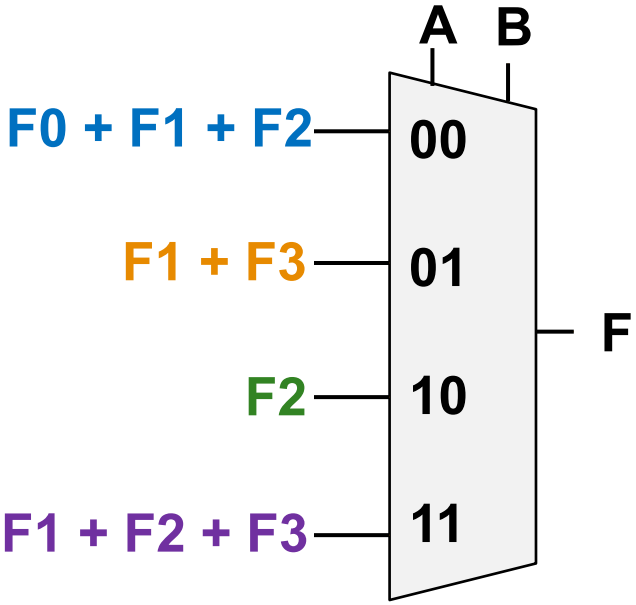
$$F = F0 + F1 + F2 + F5 + F7 + F10 + F13 + F14 + F15$$

Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

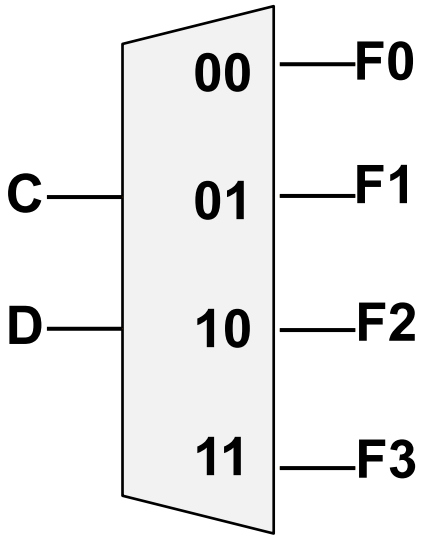


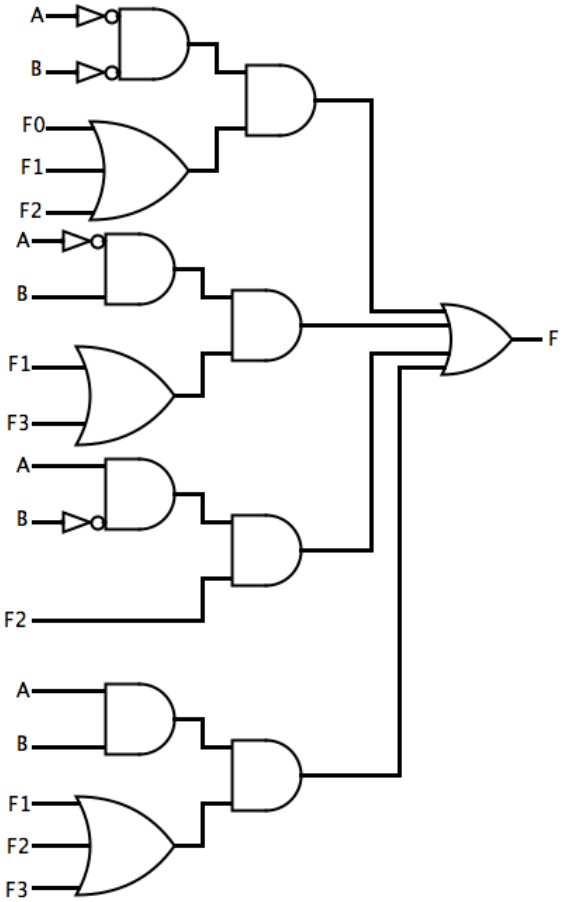


Função booleana com DECOD 2:4

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1



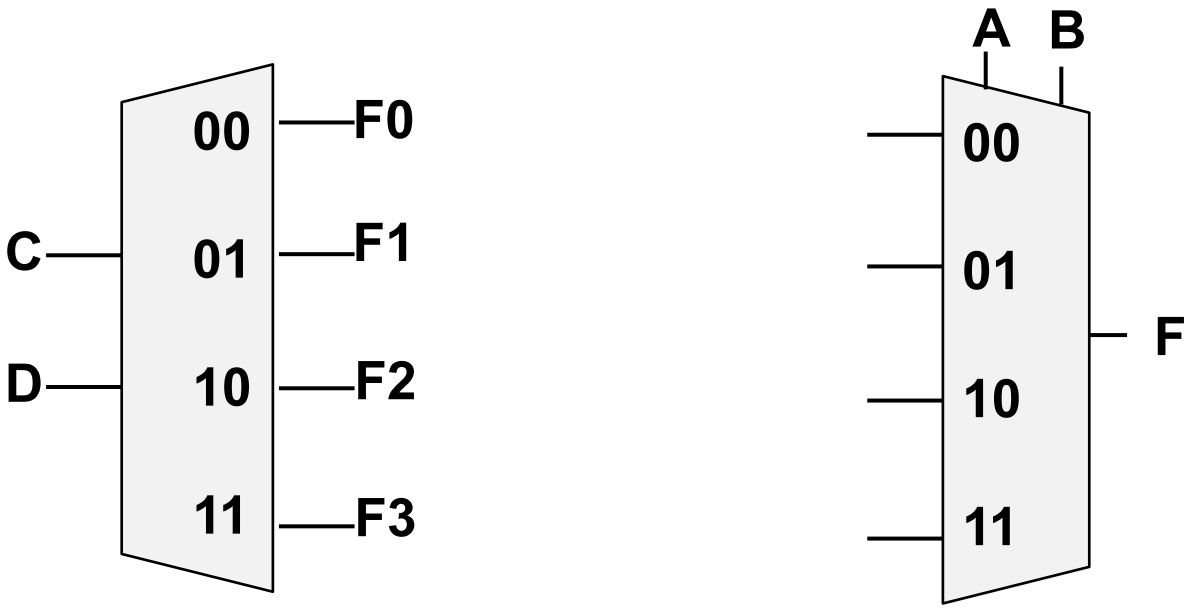


$$F(A,B,C,D) = \overline{A}\,\overline{B}(F0 + F1 + F2) + \overline{A}B(F1 + F3) + A\overline{B}(F2) + AB(F1 + F2 + F3)$$

Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

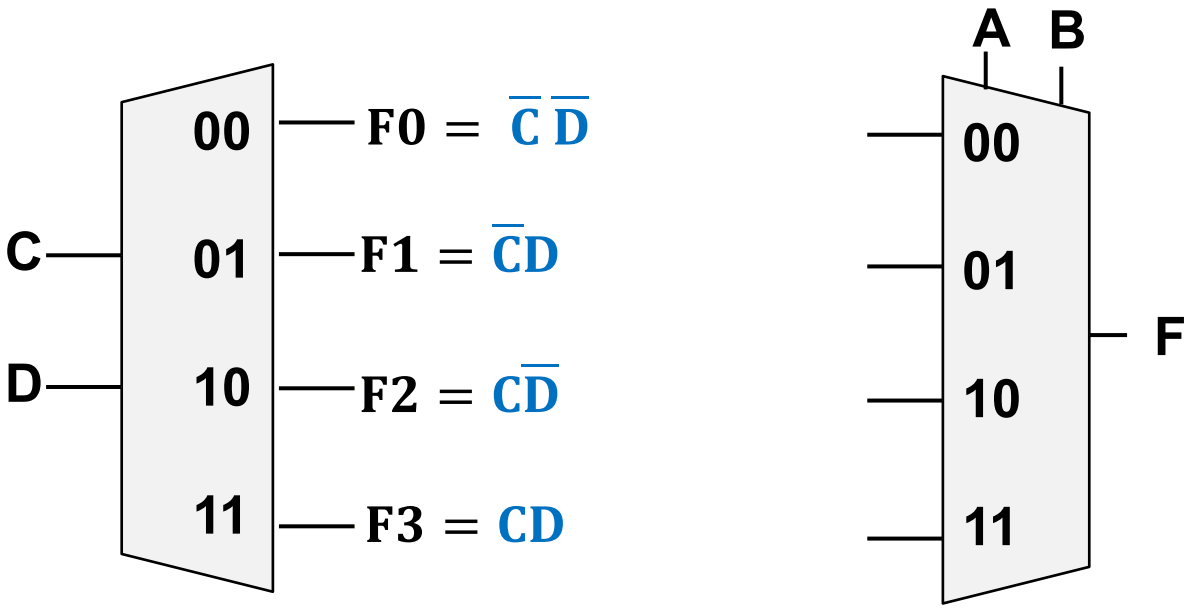
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

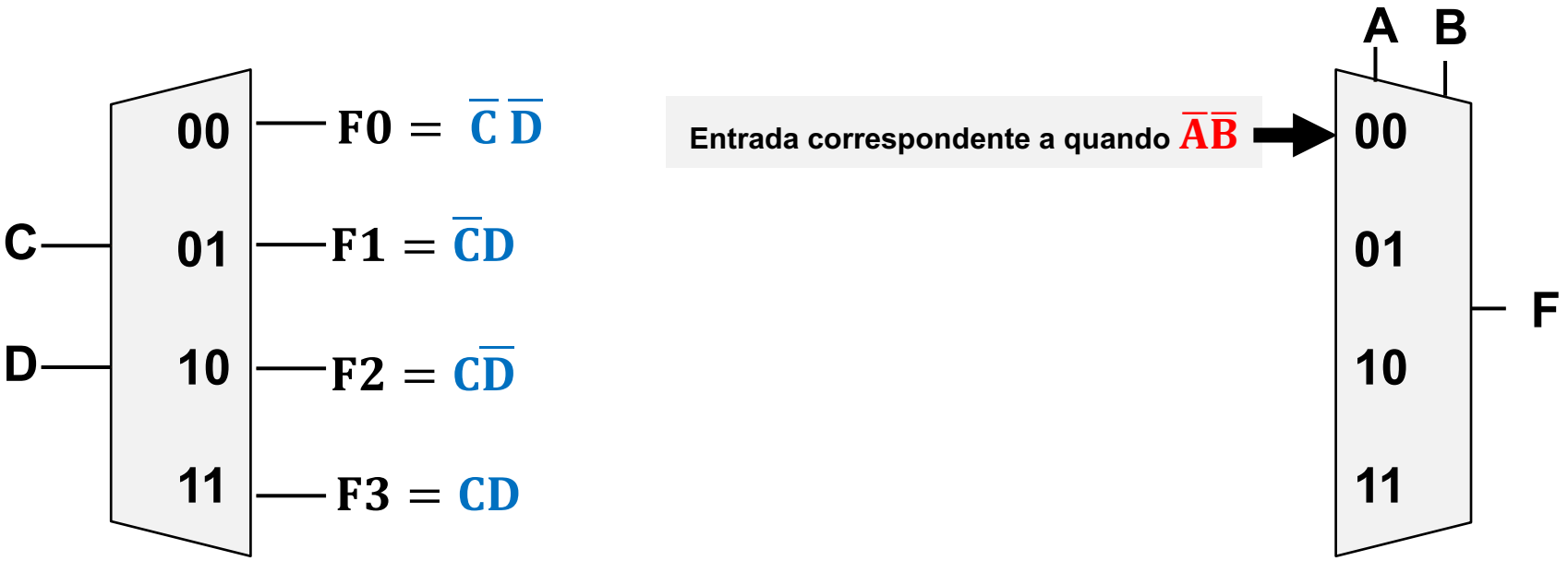
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

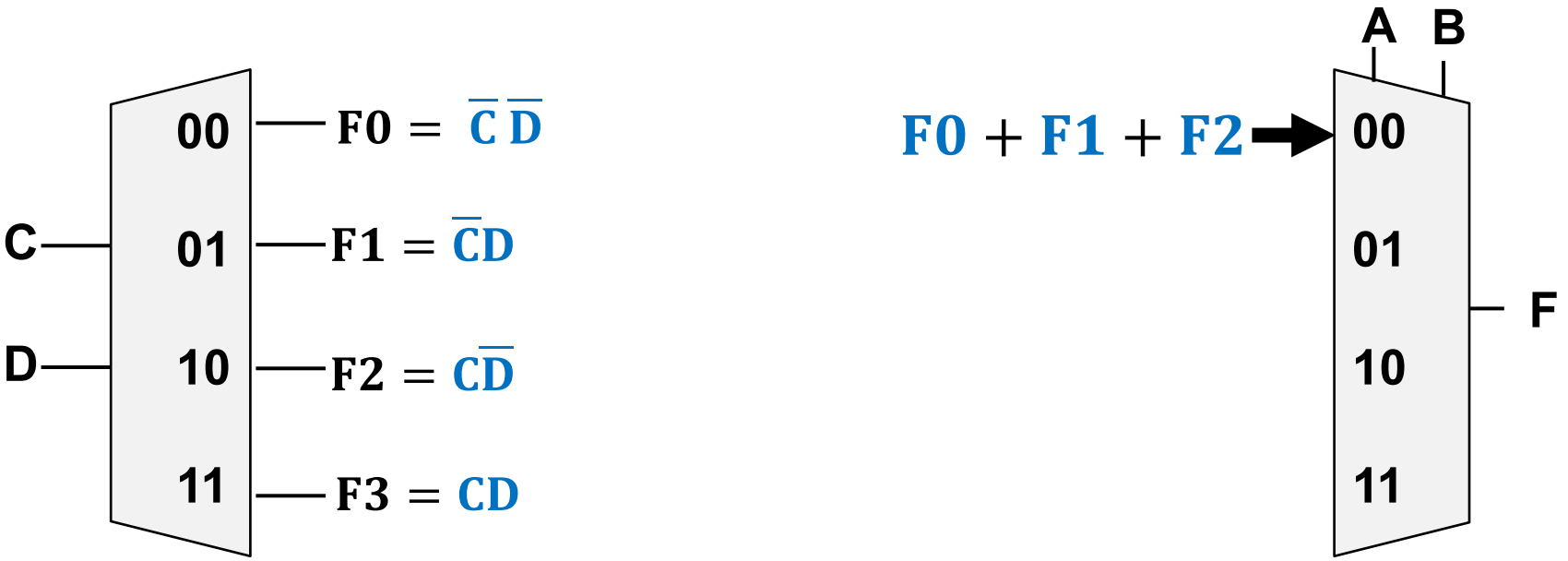
$$F(A,B,C,D) = \overline{A}\overline{B}\overline{C}\,\overline{D} + \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}D + \overline{A}BCD + A\overline{B}C\overline{D} + AB\overline{C}D + ABC\overline{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

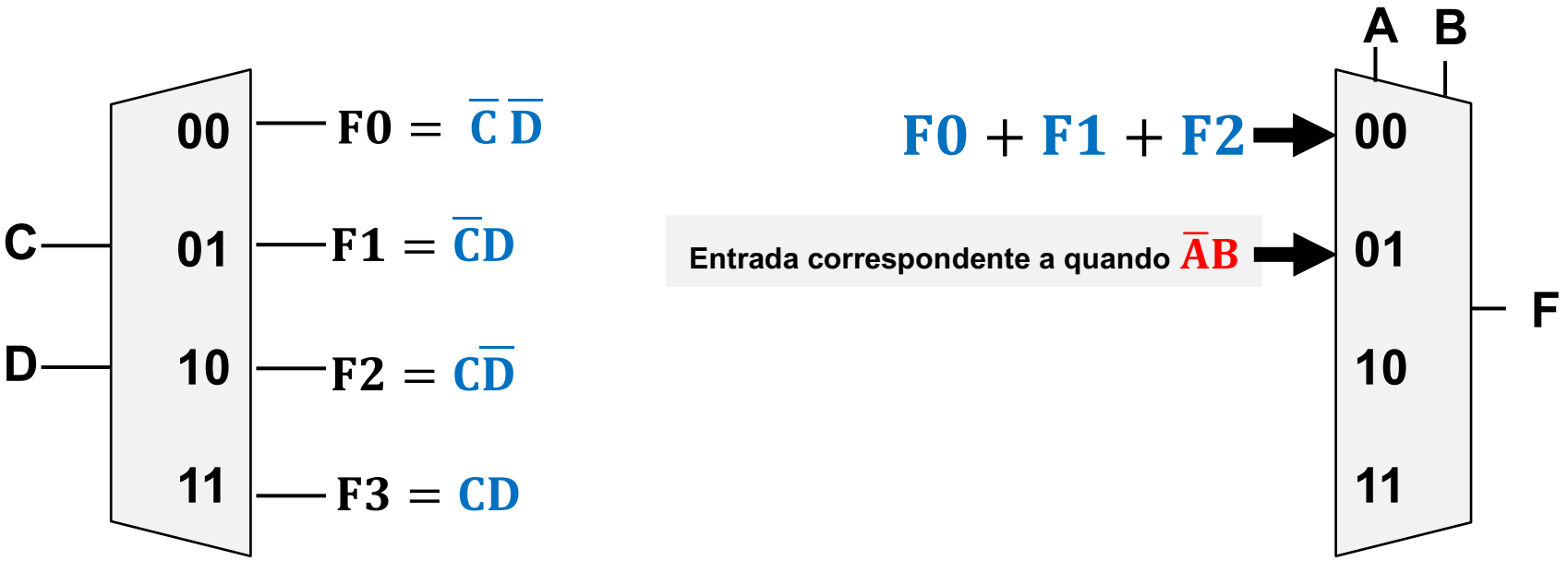
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

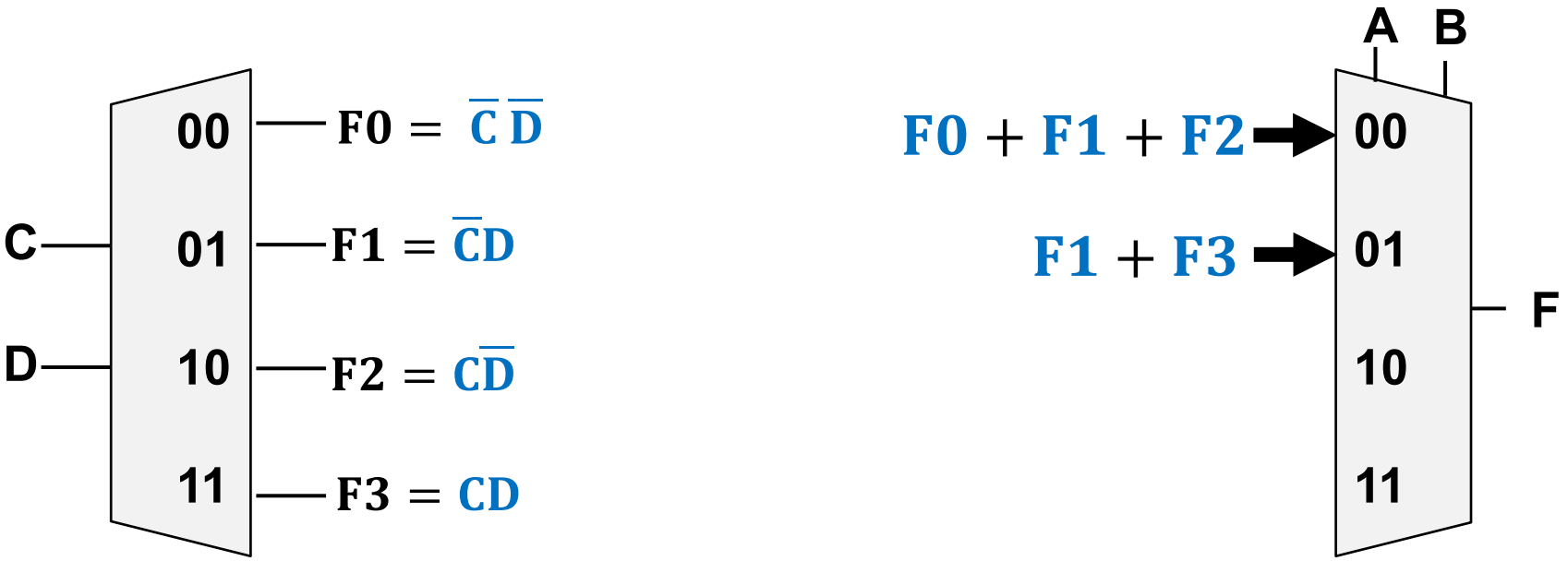
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

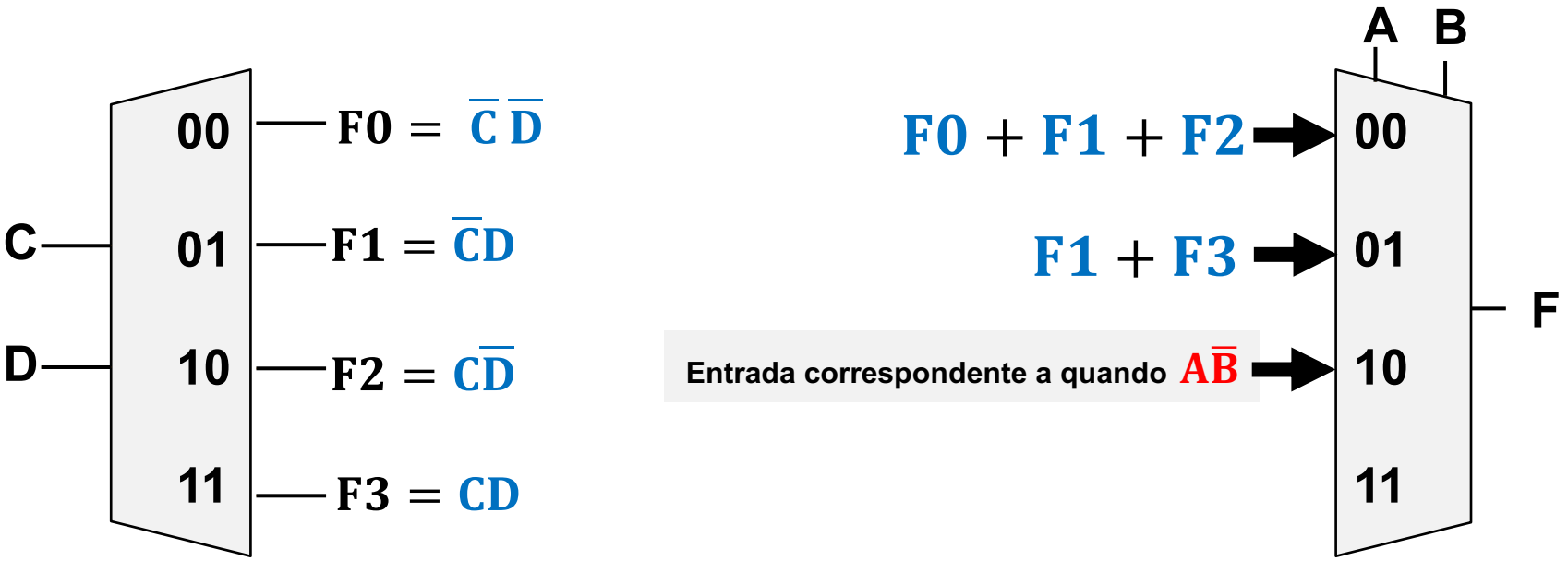
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

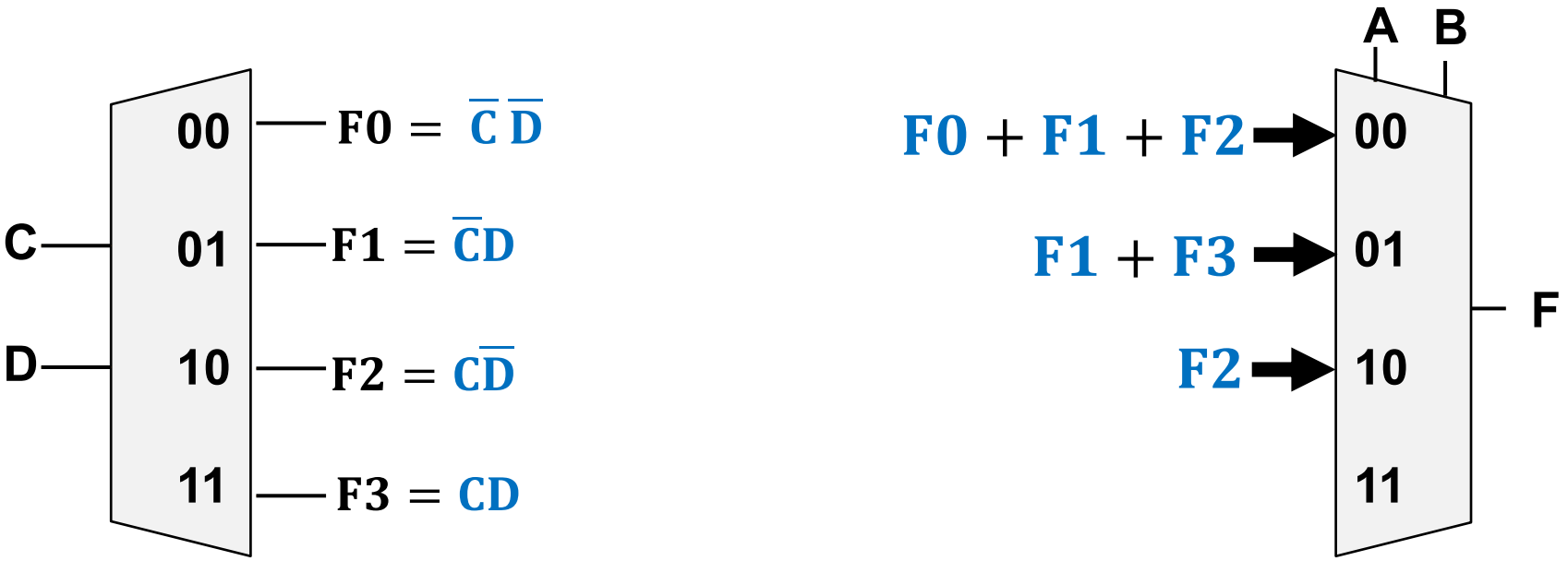
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

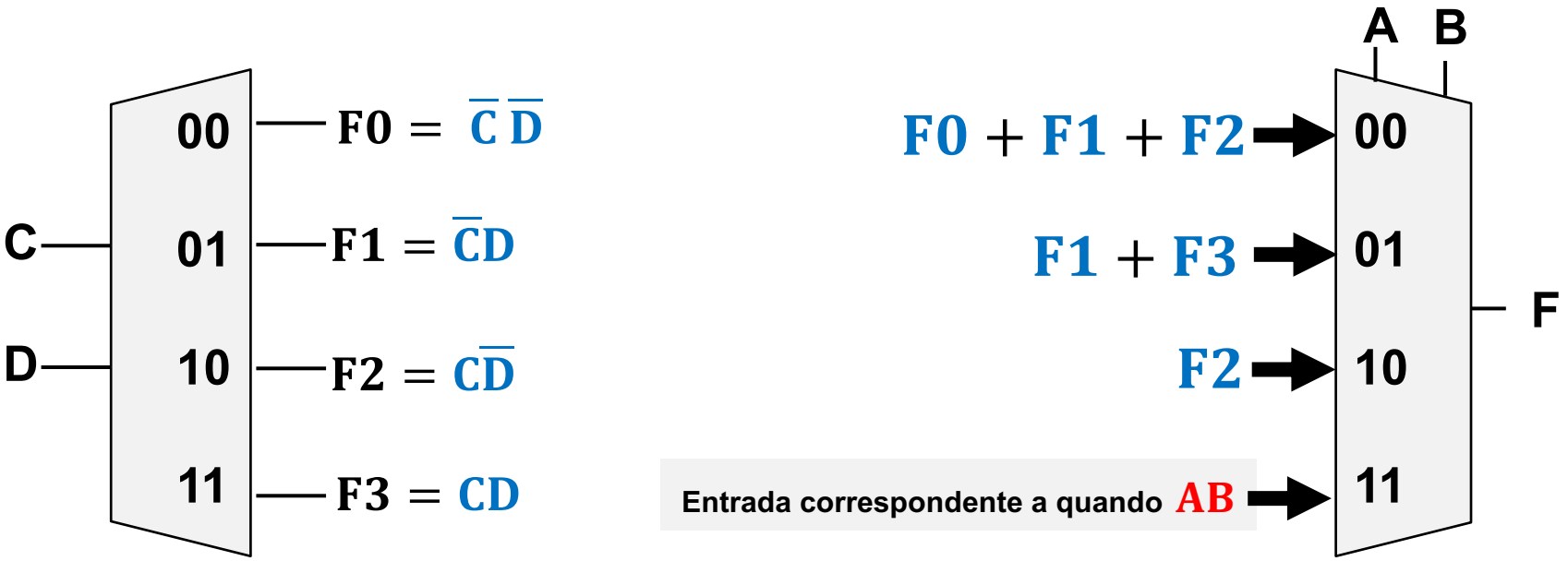
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

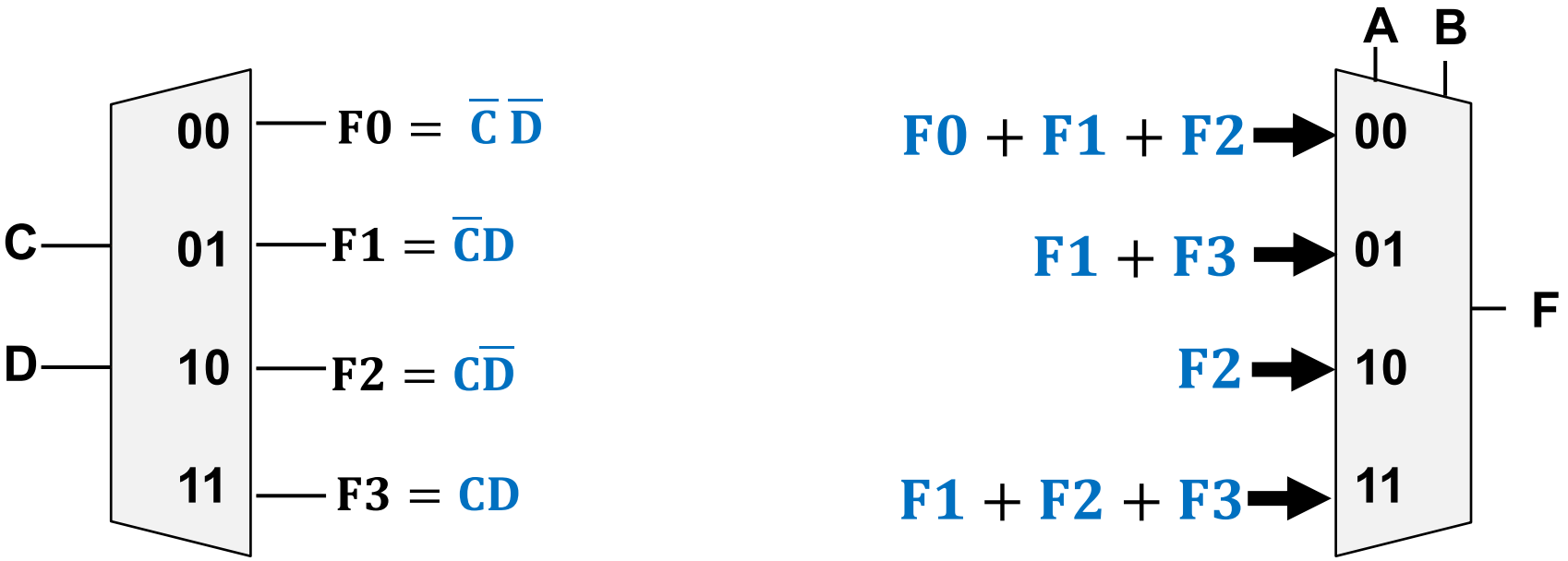
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



Função booleana com DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

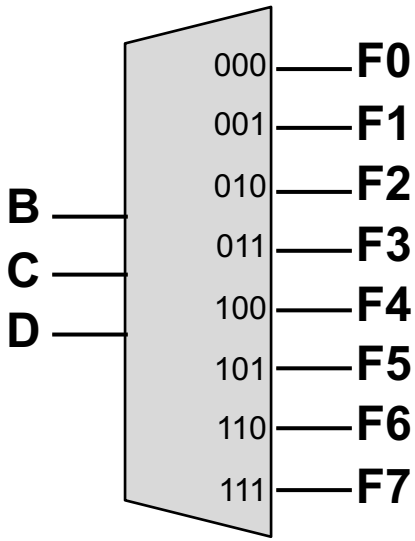
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$

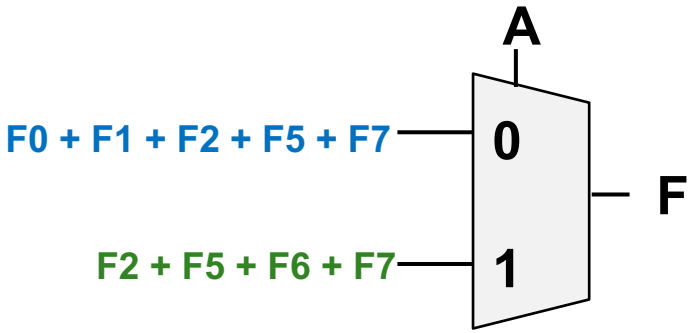


Função booleana com DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

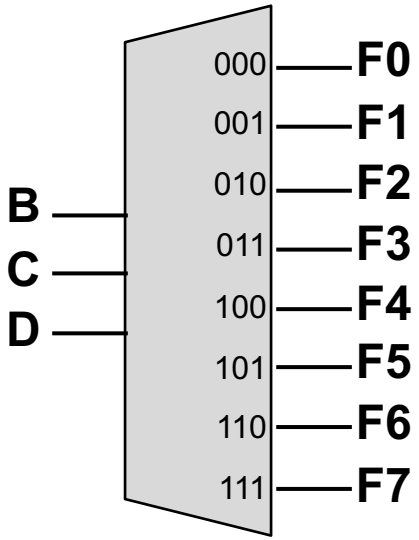


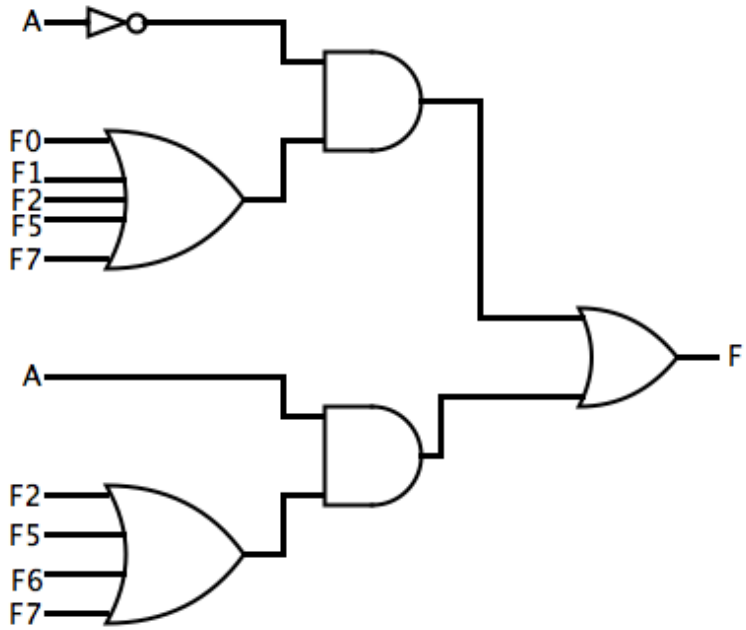


Função booleana com DECOD 3:8

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1



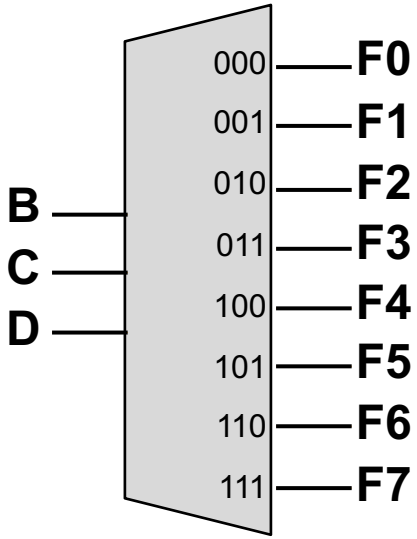


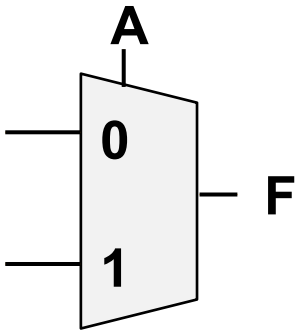
$$F(A,B,C,D) = \overline{A}(F0 + F1 + F2 + F5 + F7) + A(F2 + F5 + F6 + F7)$$

Função booleana com DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$

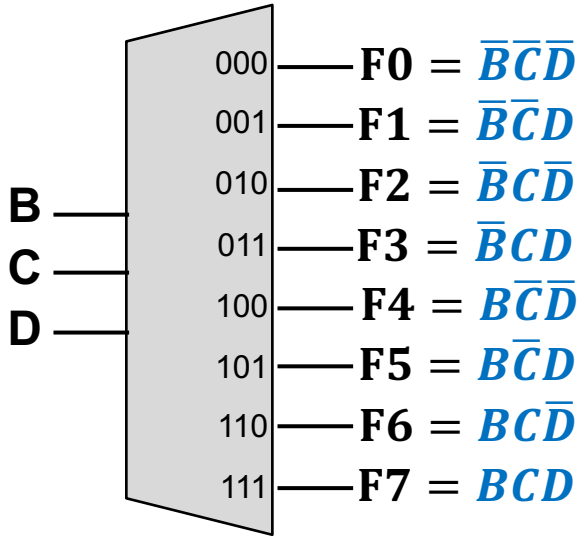


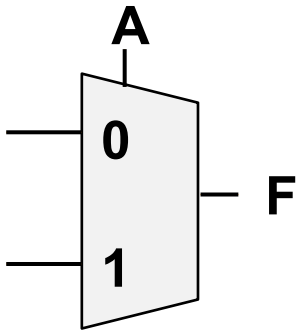


Função booleana com DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$

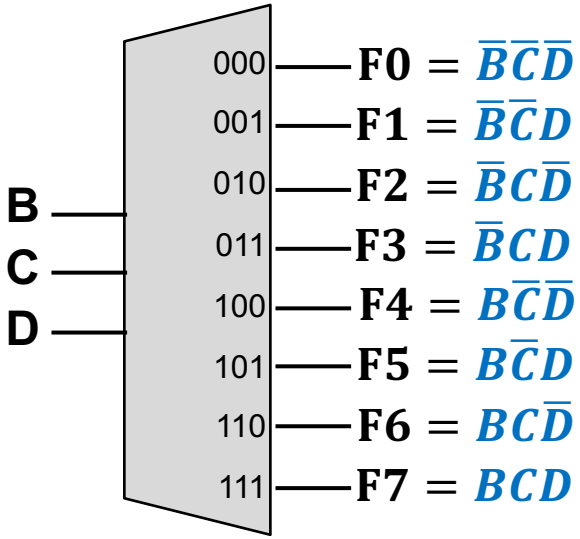


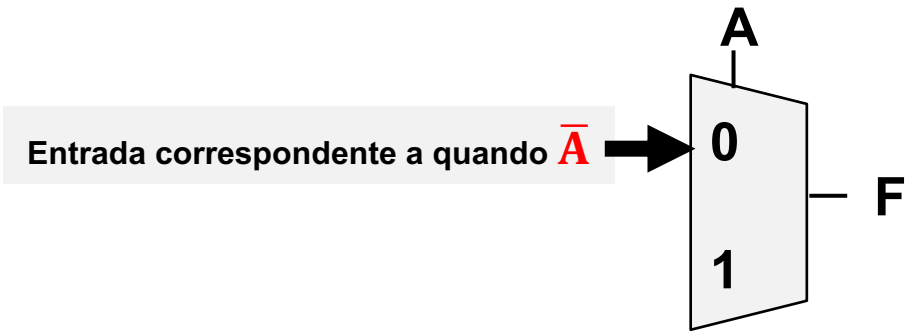


Função booleana com DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$

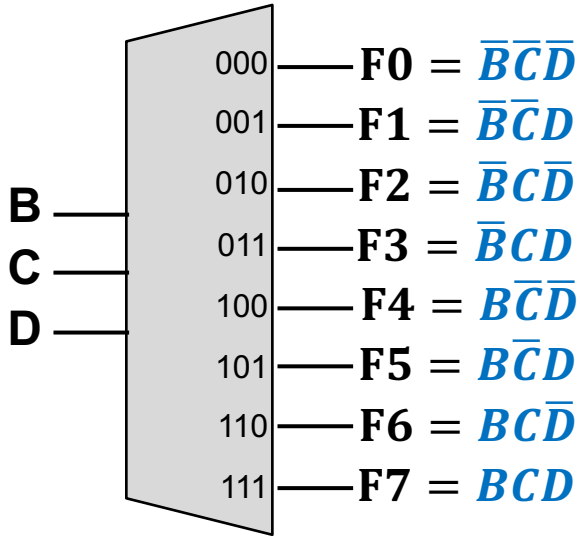




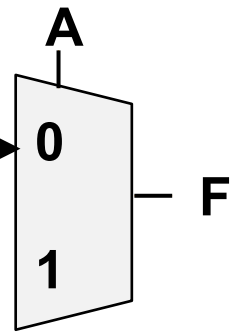
Função booleana com DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



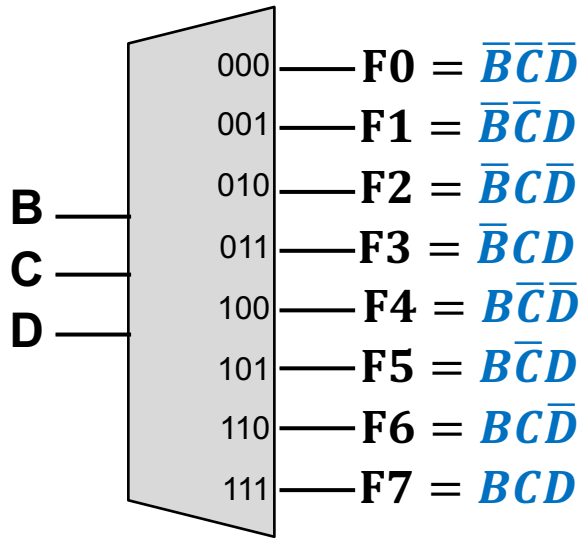
$$F0 + F1 + F2 + F5 + F7$$

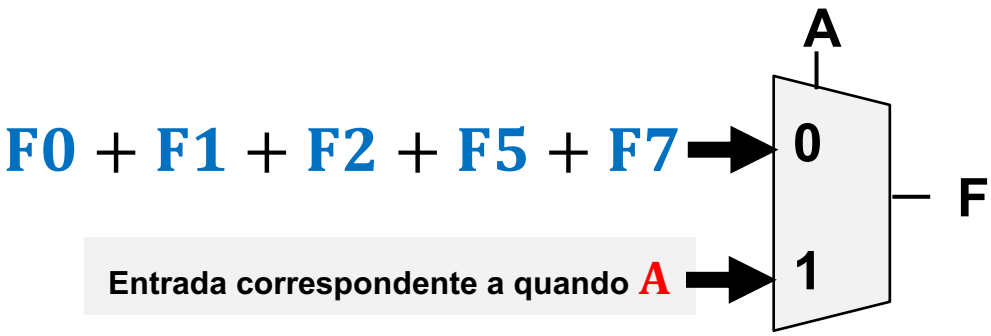


Função booleana com DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$

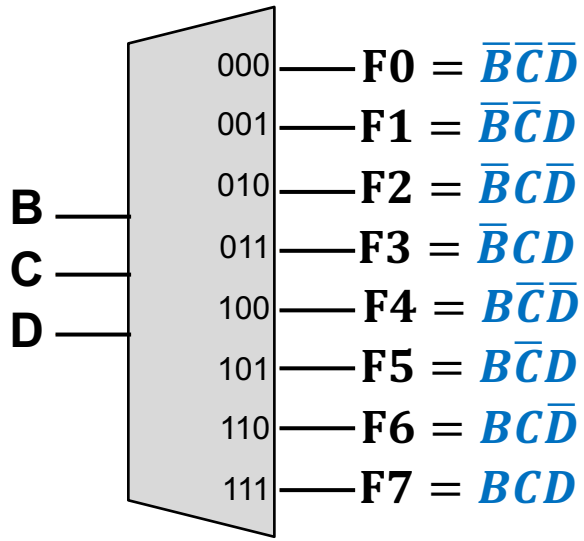


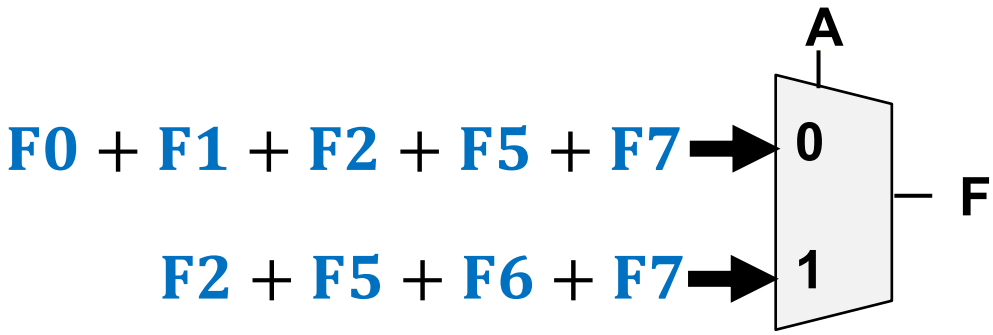


Função booleana com DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,1,2,5,7,10,13,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$$



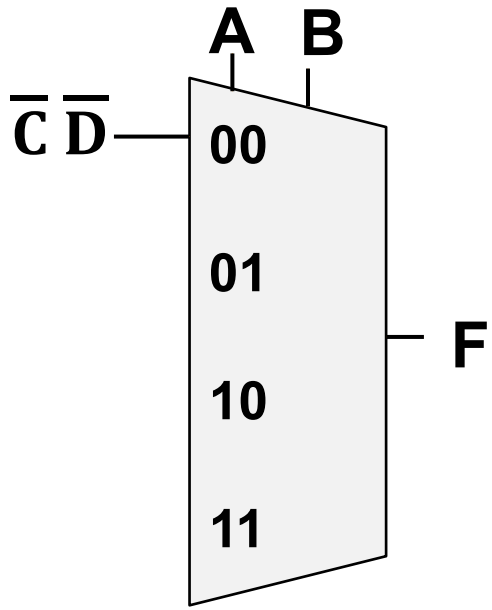


Exercício 2 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

AB \ CD	00	01	11	10
00	1 (0)	0 (1)	0 (3)	0 (2)
01	0 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	1 (9)	0 (11)	0 (10)

$F = \overline{C}\,\overline{D}$



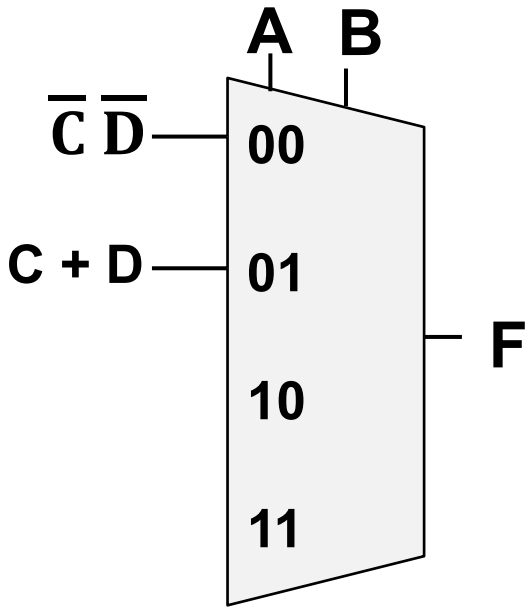
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 2 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

AB \ CD	00	01	11	10
00	1 (0)	0 (1)	0 (3)	0 (2)
01	0 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	1 (9)	0 (11)	0 (10)

$F = C + D$



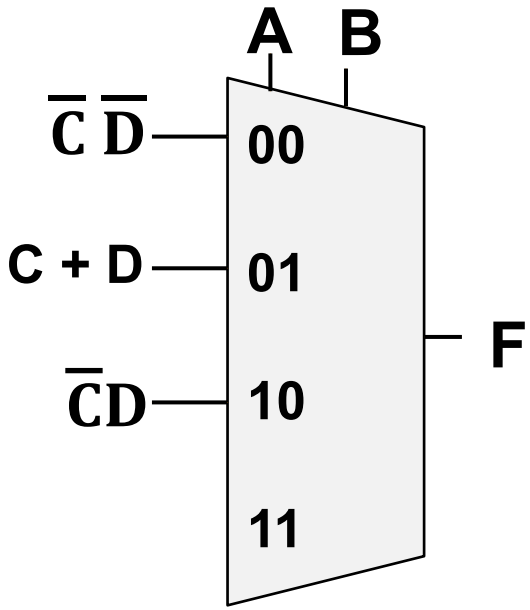
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 2 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

AB \ CD	00	01	11	10
00	1 (0)	0 (1)	0 (3)	0 (2)
01	0 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	1 (9)	0 (11)	0 (10)

$F = \overline{C}D$



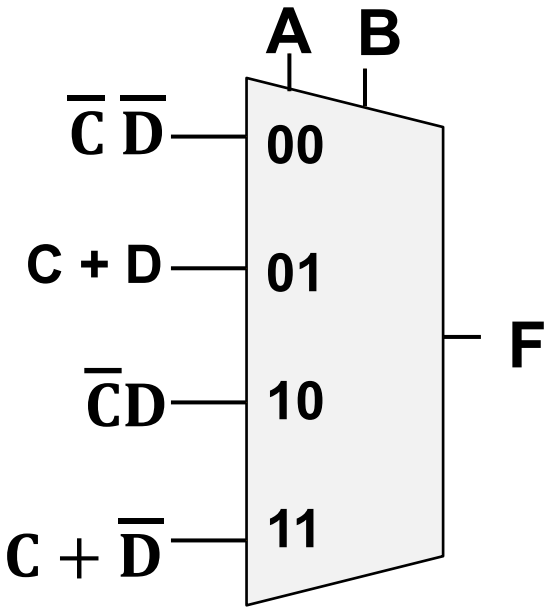
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 2 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

AB \ CD	00	01	11	10
00	1 (0)	0 (1)	0 (3)	0 (2)
01	0 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	1 (9)	0 (11)	0 (10)

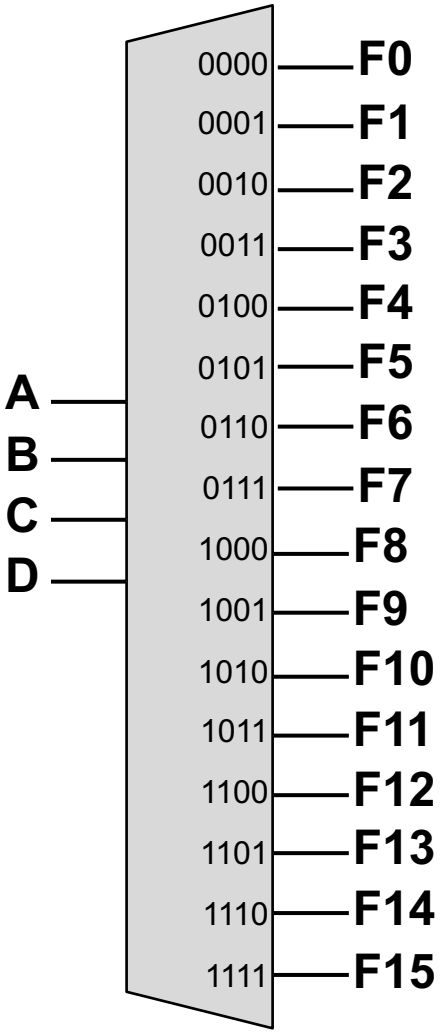
$F = C + \overline{D}$



→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 2 – DECOD 4:16

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$



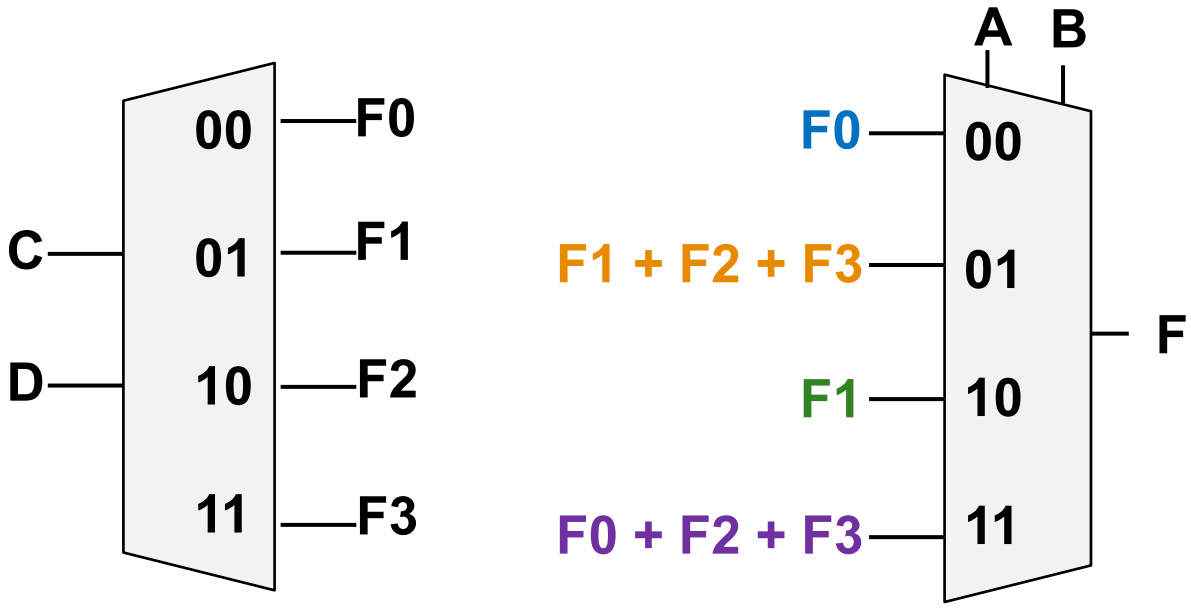
COM DECODIFICADOR 4:16

$$F = F0 + F5 + F6 + F7 + F9 + F12 + F14 + F15$$

Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

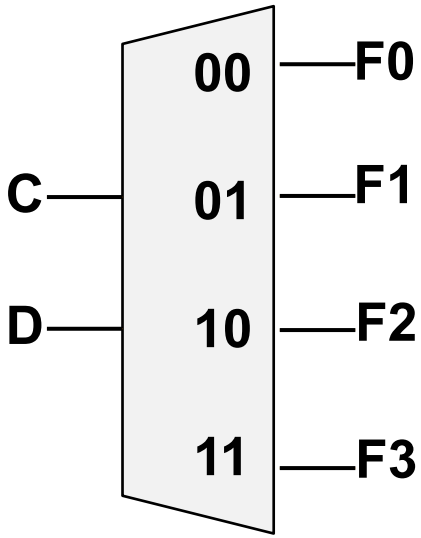
A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

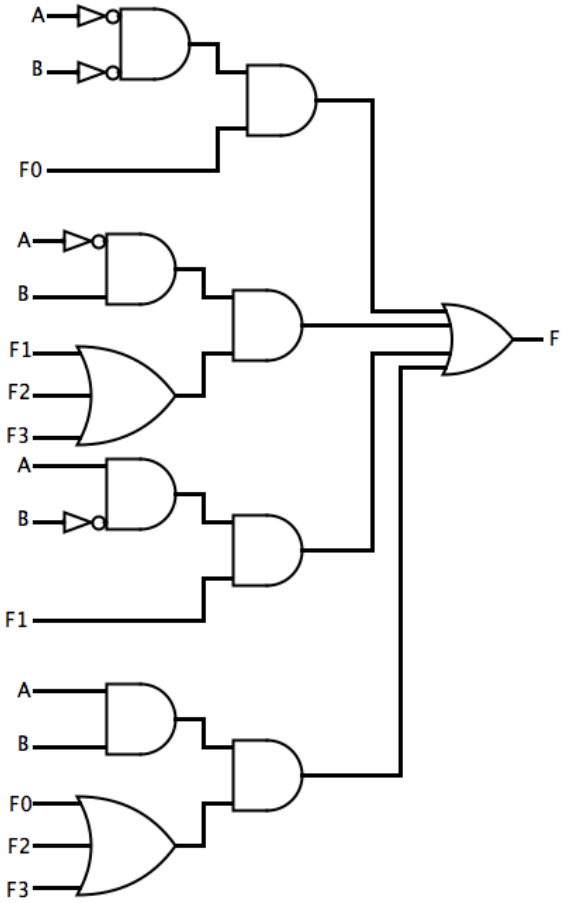


Exercício 2 – DECOD 2:4

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1



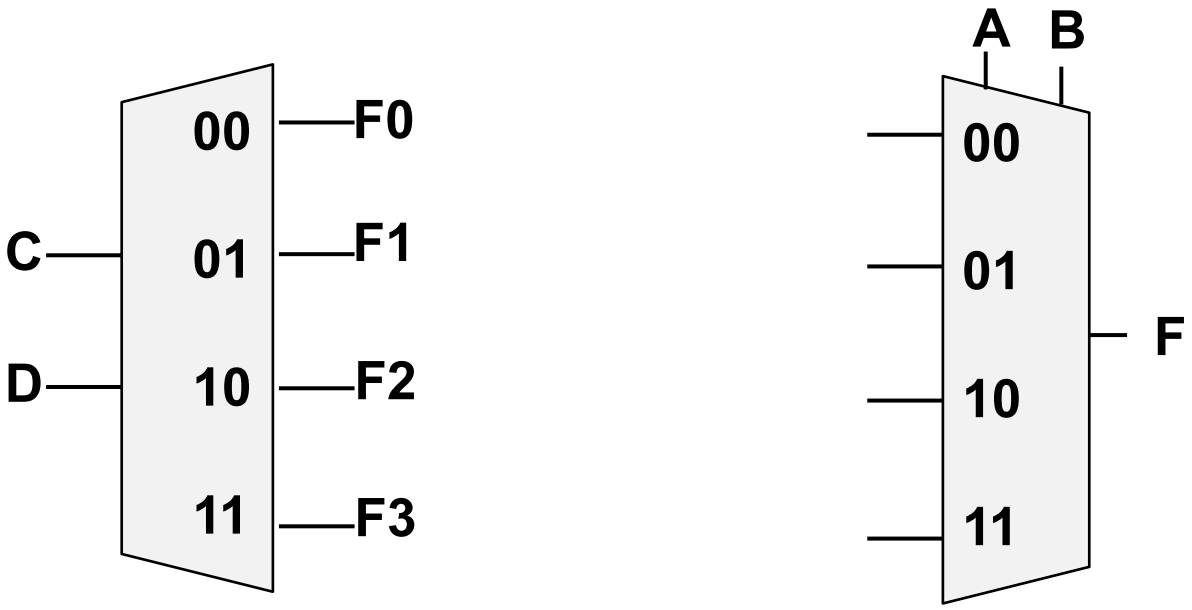


$$F(A,B,C,D) = \overline{A}\,\overline{B}(F0) + \overline{A}B(F1 + F2 + F3) + A\overline{B}(F1) + AB(F0 + F2 + F3)$$

Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

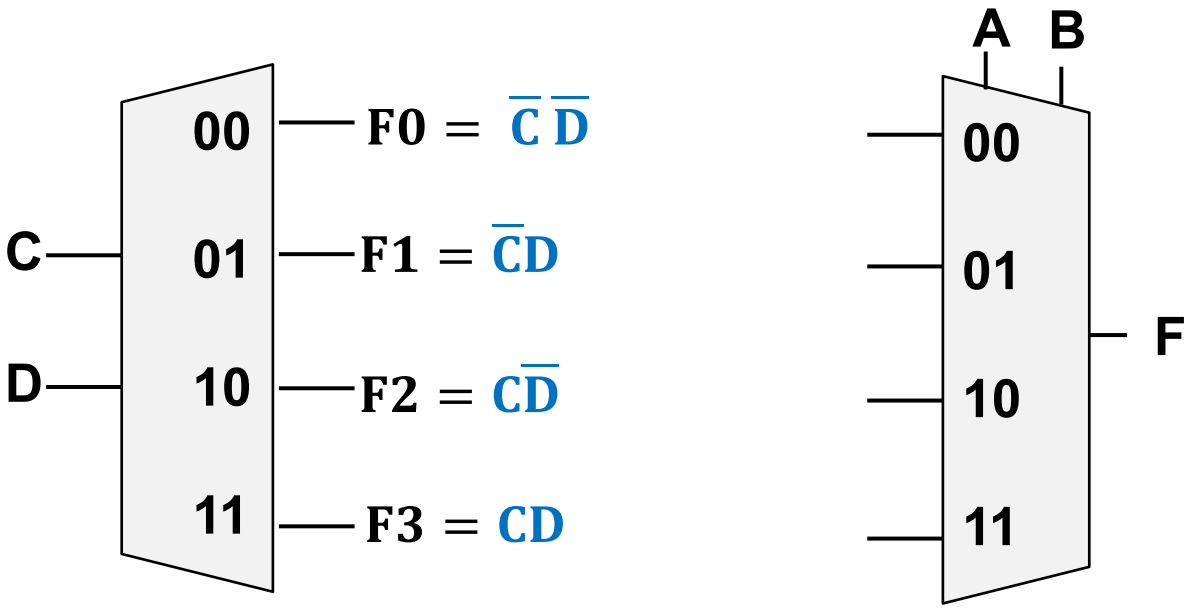
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$



Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

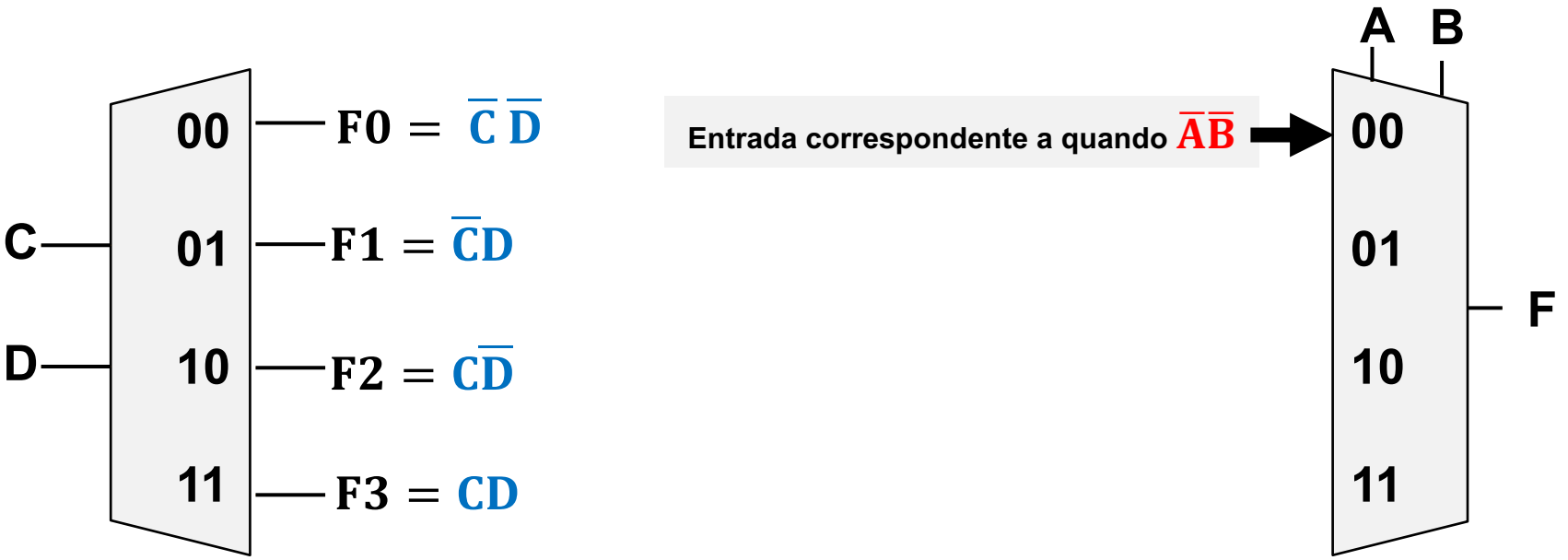
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$



Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

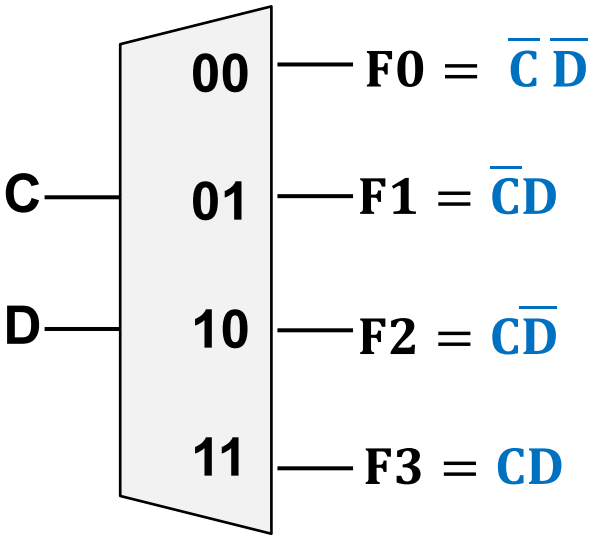
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

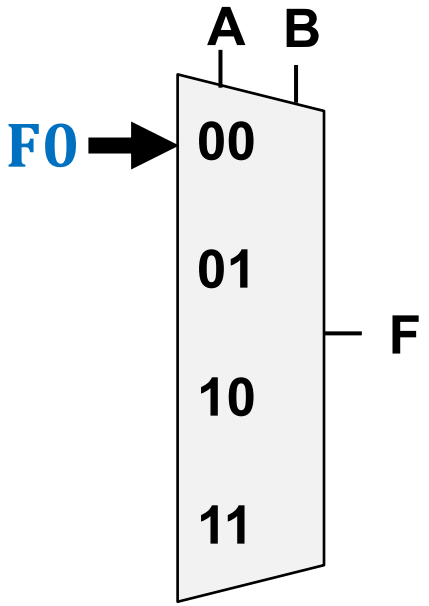


Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

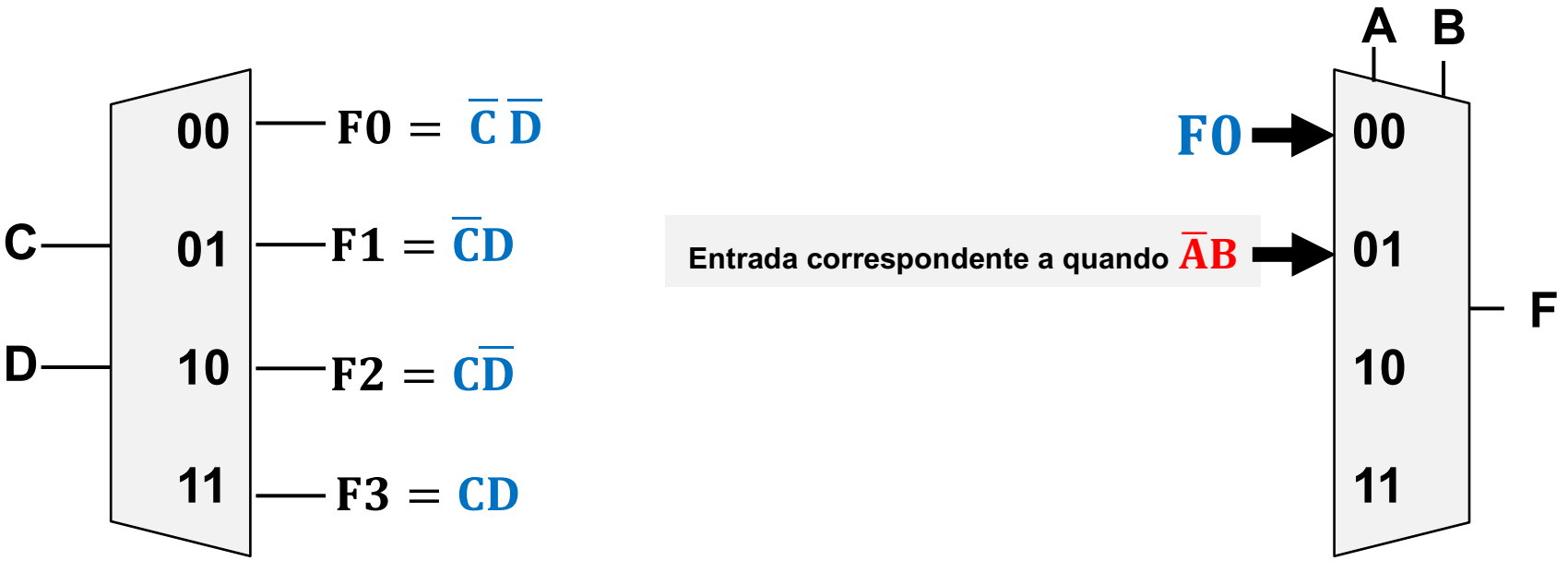




Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

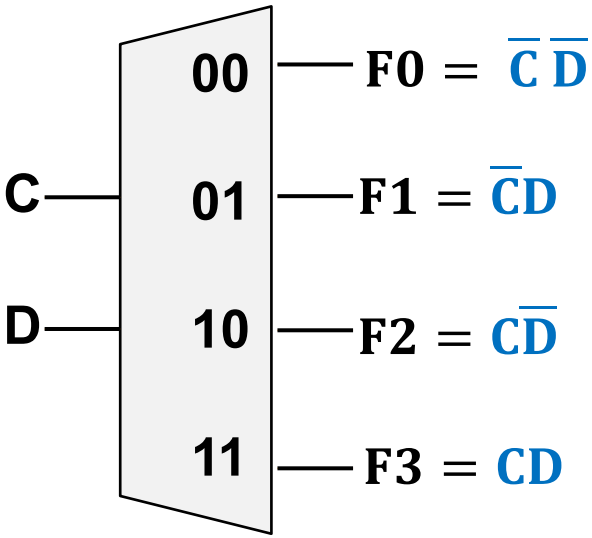
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

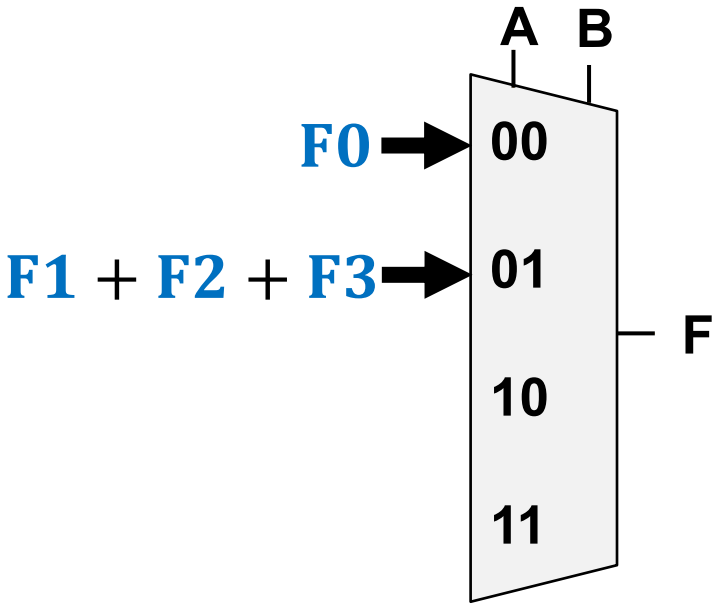


Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

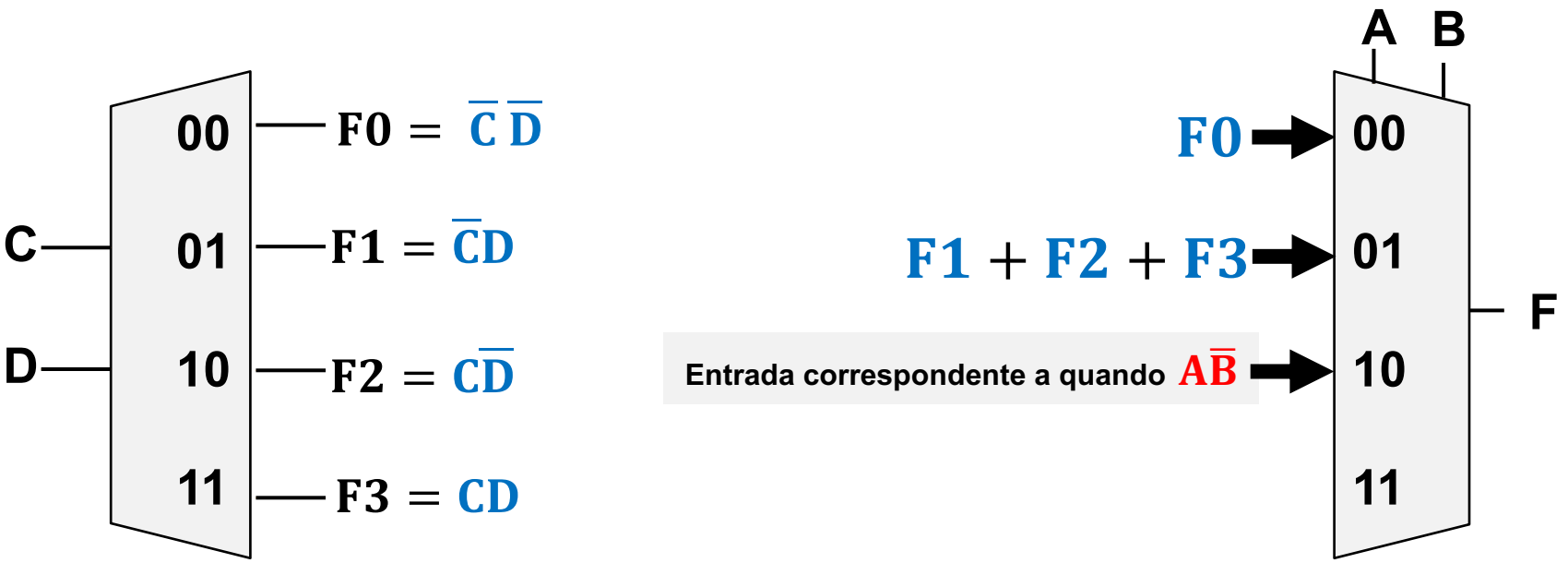




Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

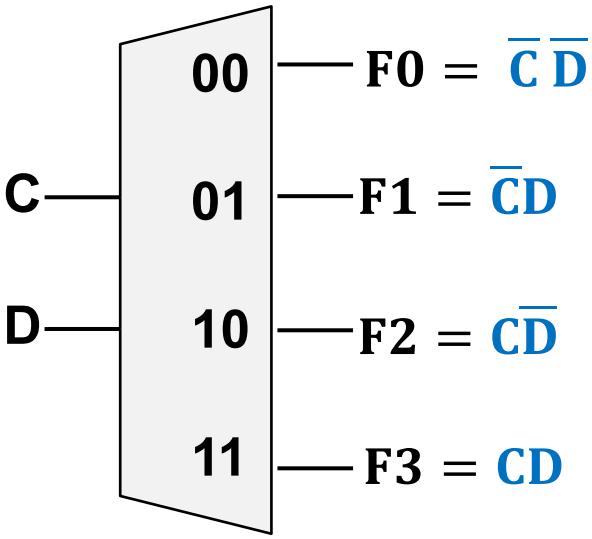
$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

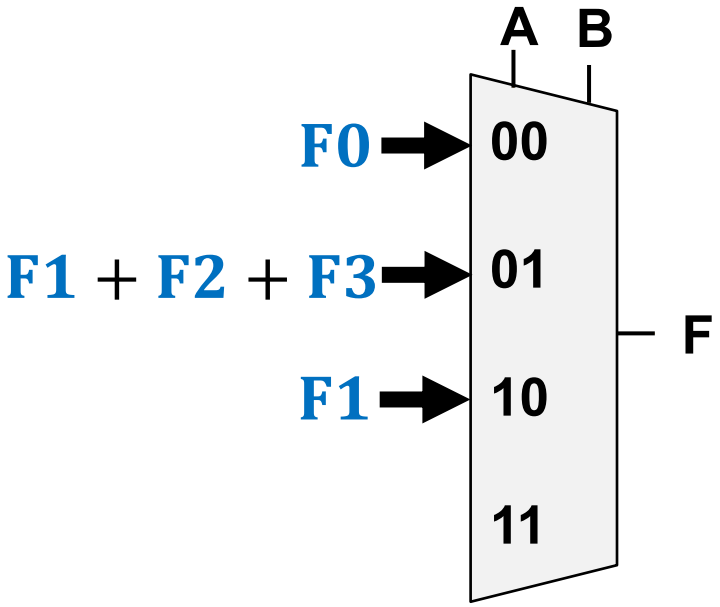


Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

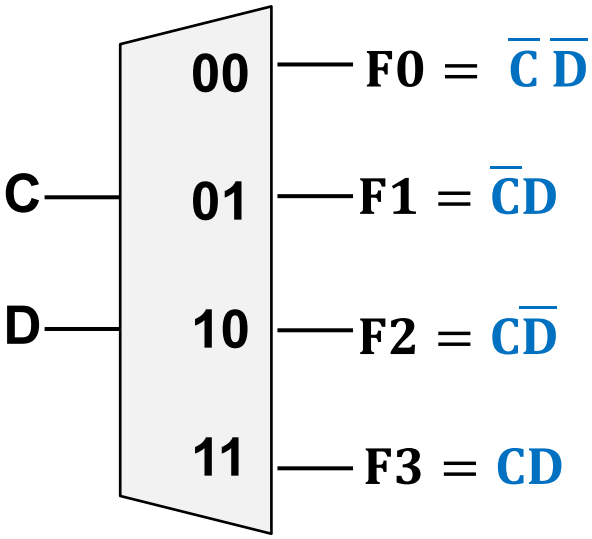


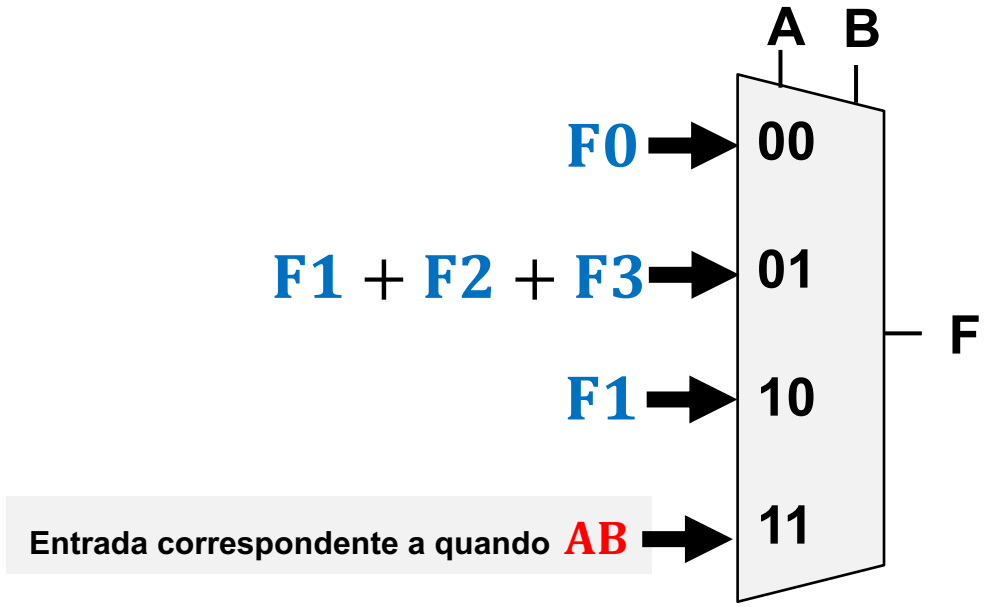


Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

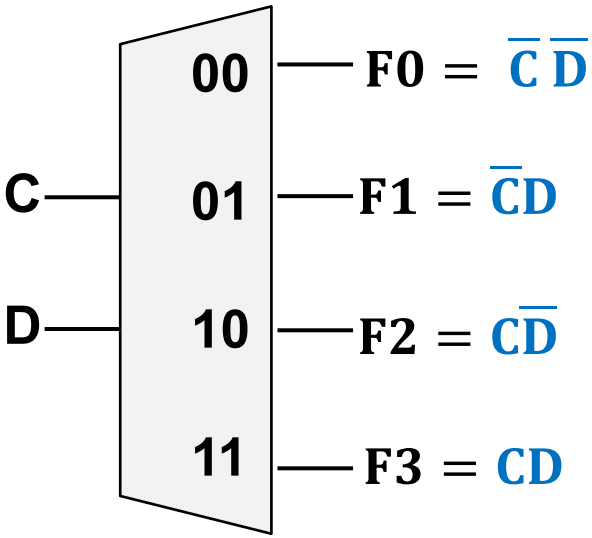


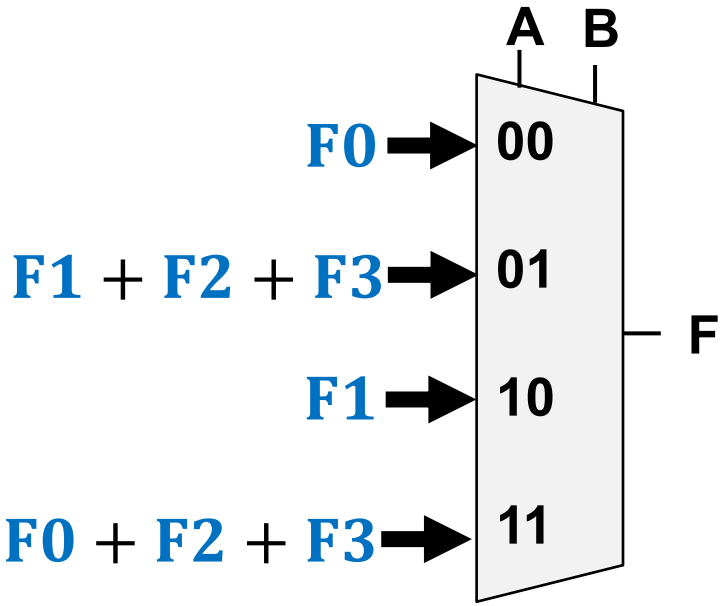


Exercício 2 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

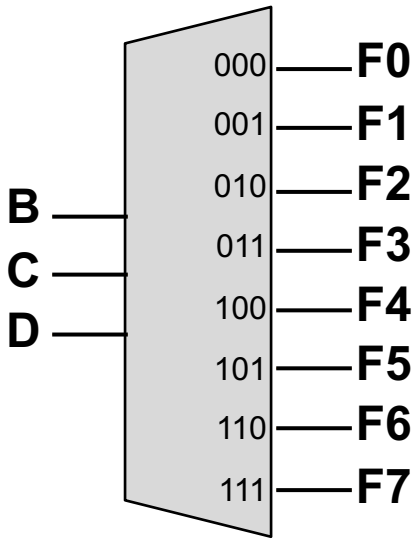


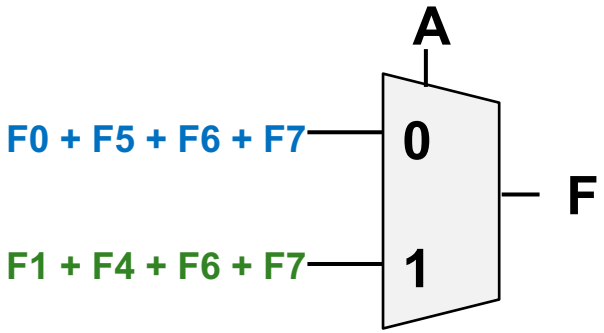


Exercício 2 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

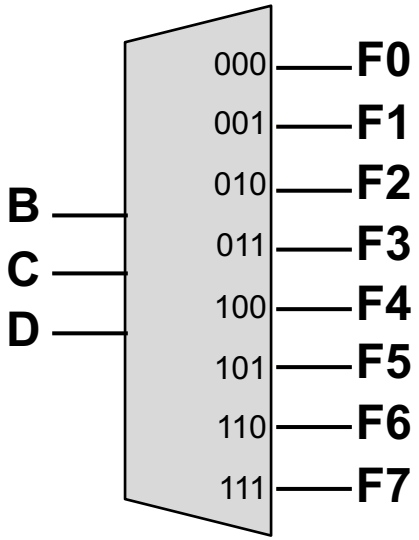


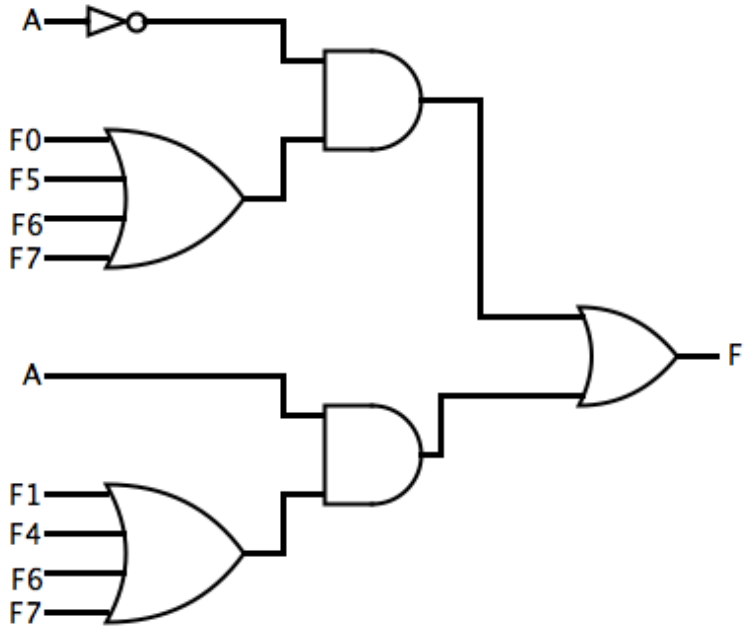


Exercício 2 – DECOD 3:8

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1



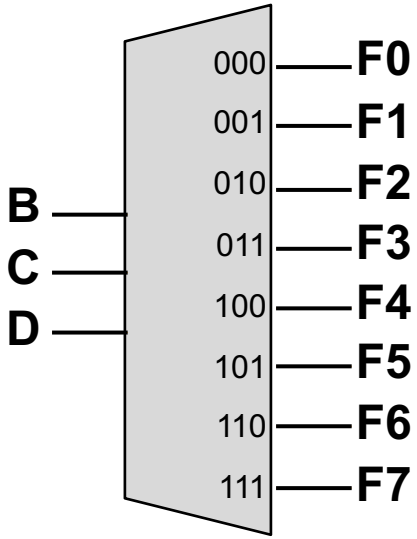


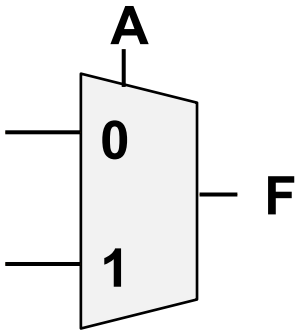
$$F(A,B,C,D) = \overline{A}(F0 + F5 + F6 + F7) + A(F1 + F4 + F6 + F7)$$

Exercício 2 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

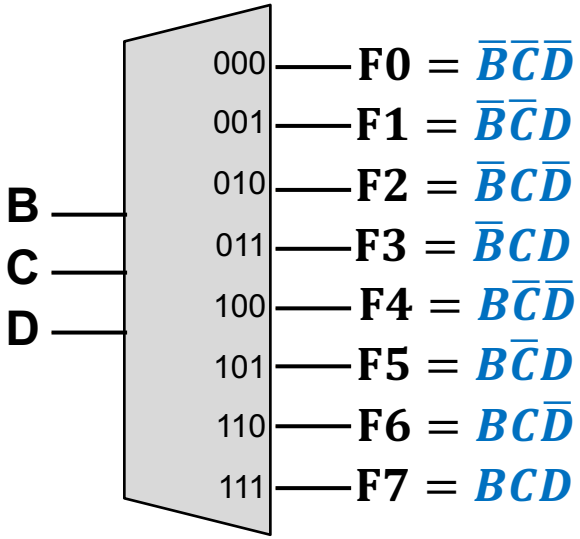


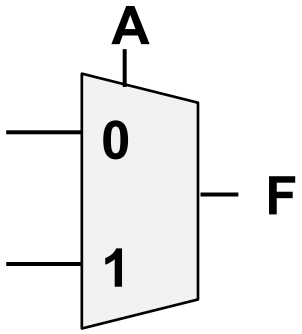


Exercício 2 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$\mathbf{F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD}$$

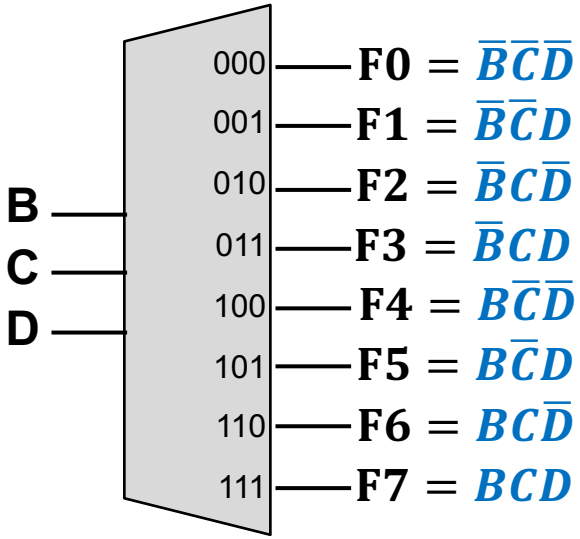


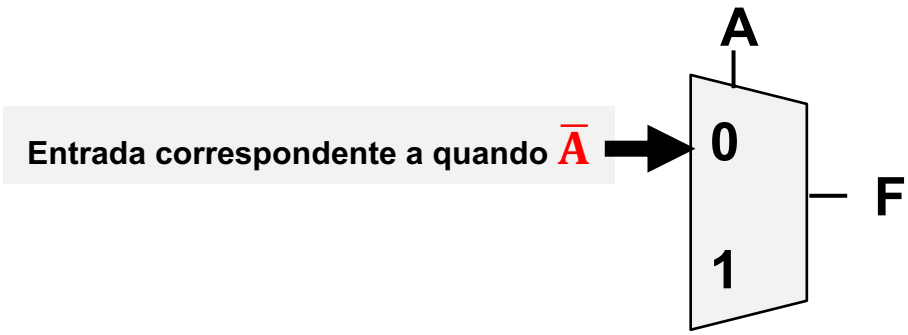


Exercício 2 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

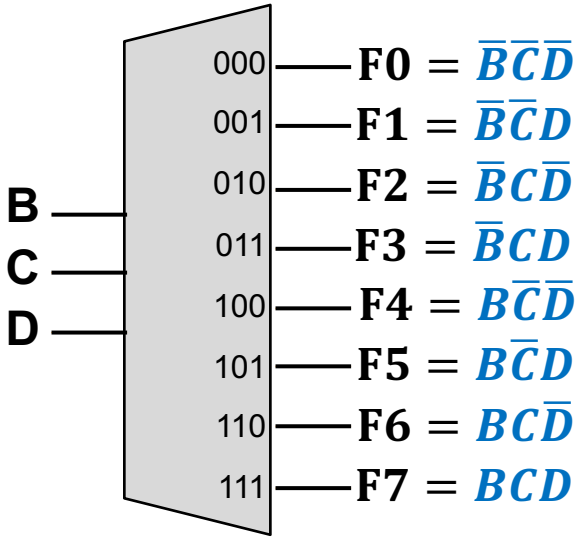


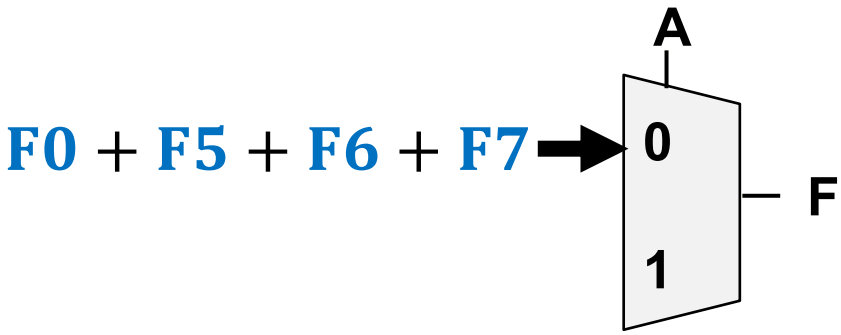


Exercício 2 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

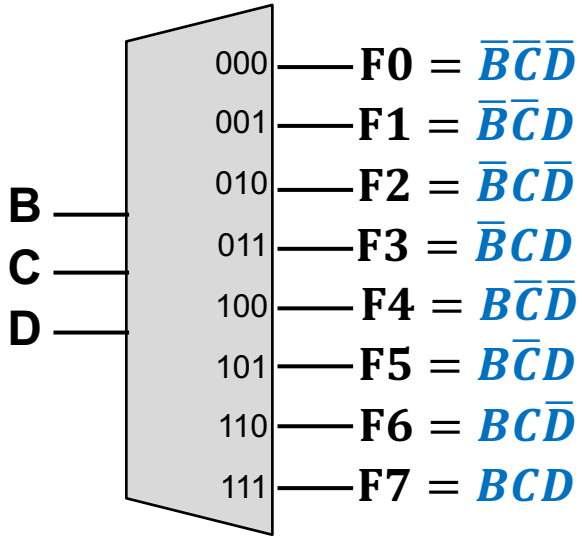


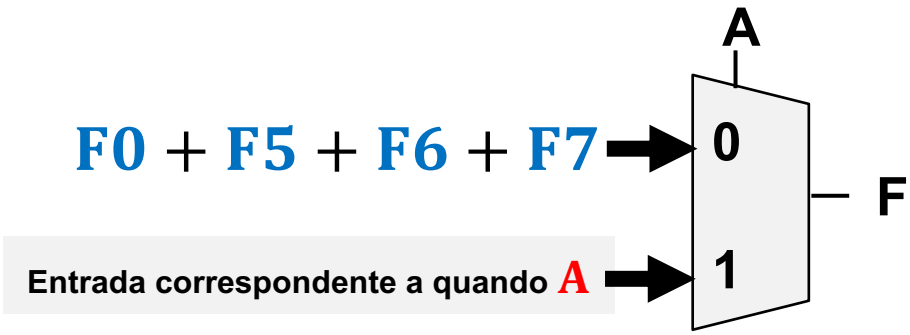


Exercício 2 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\,\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

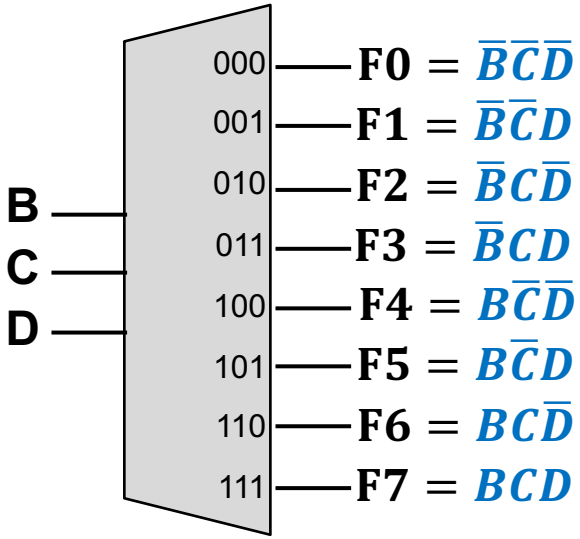


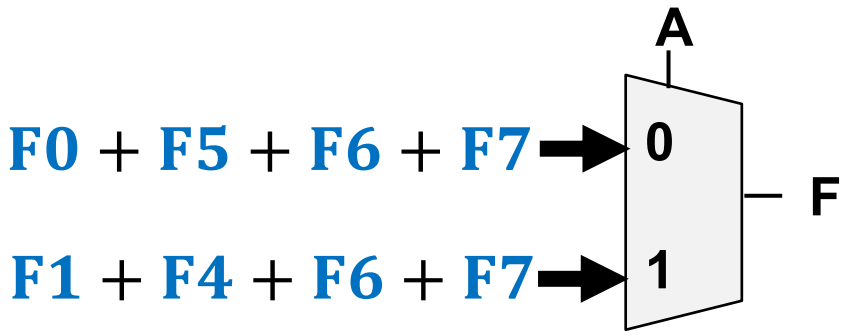


Exercício 2 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(0,5,6,7,9,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}D + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$



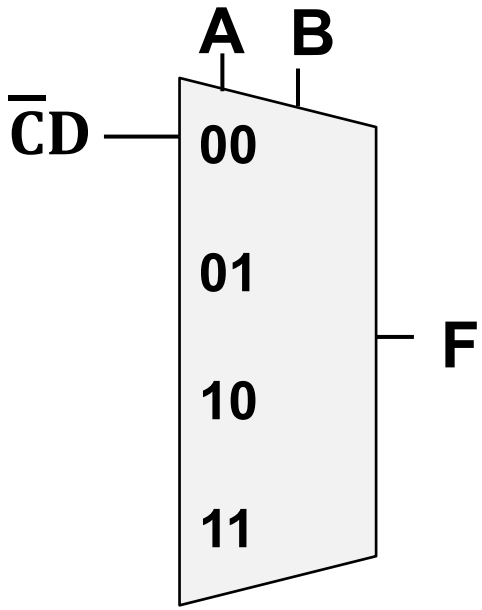


Exercício 3 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

AB \ CD	00	01	11	10
00	0 (0)	0 (1)	0 (3)	1 (2)
01	1 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	0 (9)	0 (11)	1 (10)

$F = \overline{C}D$



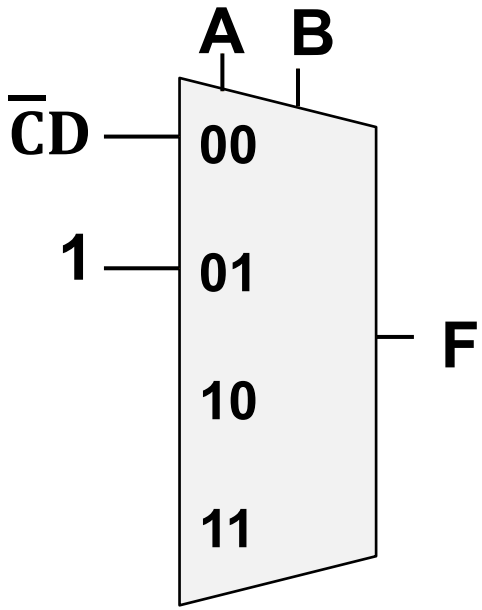
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 3 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

AB \ CD	00	01	11	10
00	0 (0)	0 (1)	0 (3)	1 (2)
01	1 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	0 (9)	0 (11)	1 (10)

F = 1



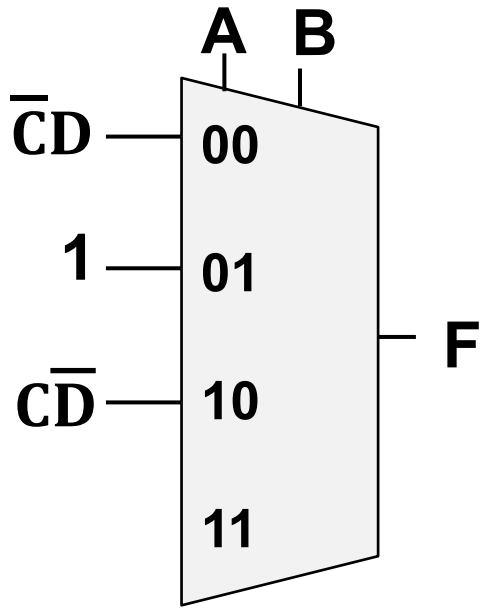
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 3 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

AB \ CD	00	01	11	10
00	0 (0)	0 (1)	0 (3)	1 (2)
01	1 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	0 (9)	0 (11)	1 (10)

$F = C\overline{D}$



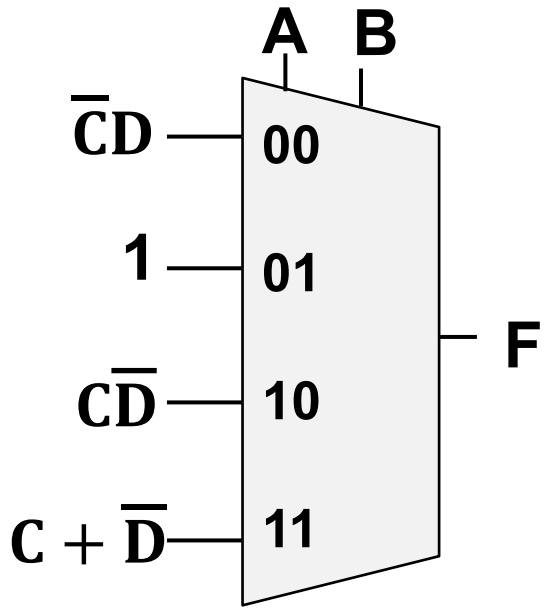
→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 3 – MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

AB \ CD	00	01	11	10
00	0 (0)	0 (1)	0 (3)	1 (2)
01	1 (4)	1 (5)	1 (7)	1 (6)
11	1 (12)	0 (13)	1 (15)	1 (14)
10	0 (8)	0 (9)	0 (11)	1 (10)

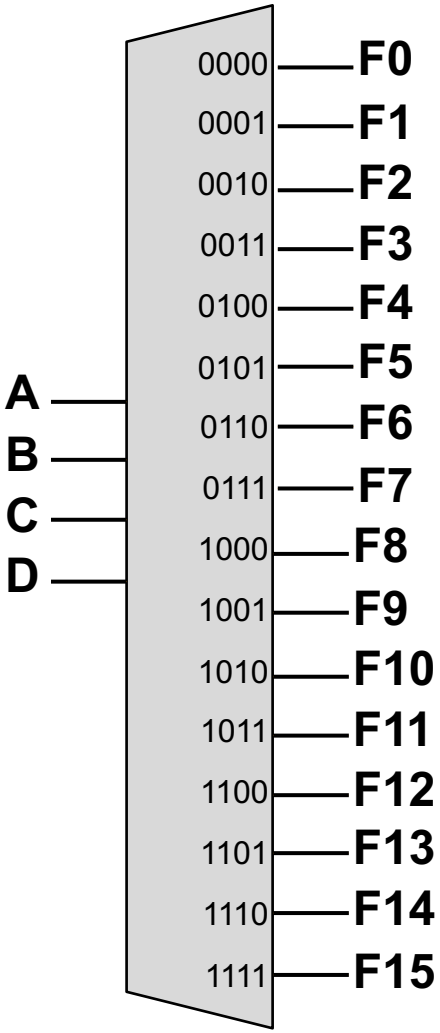
$F = C + \overline{D}$



→ **VERIFICAR CÍRCULOS NO MAPA LINHA A LINHA**

Exercício 3 – DECOD 4:16

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$



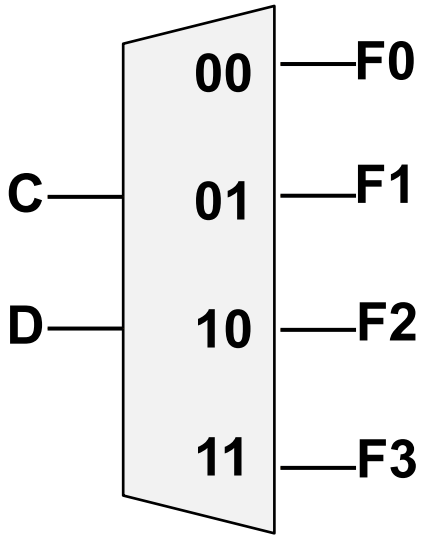
COM DECODIFICADOR 4:16

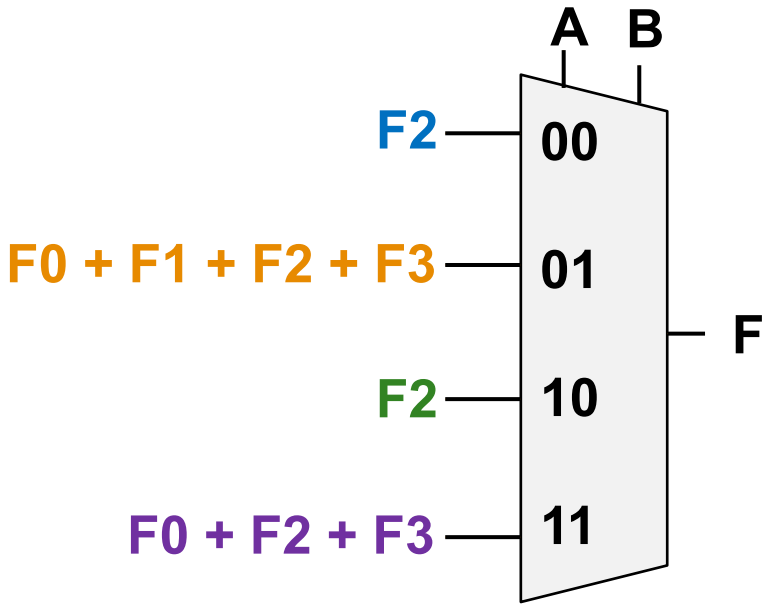
$$F = F2 + F4 + F5 + F6 + F7 + F10 + F12 + F14 + F15$$

Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

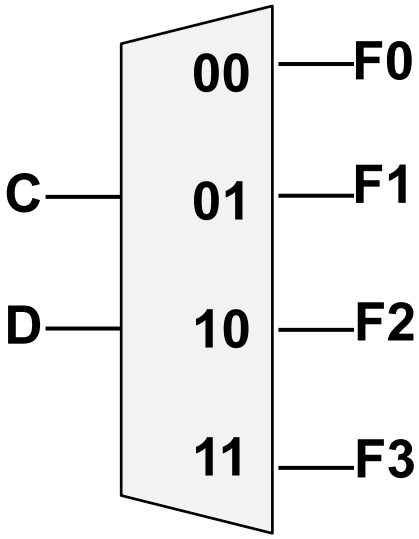


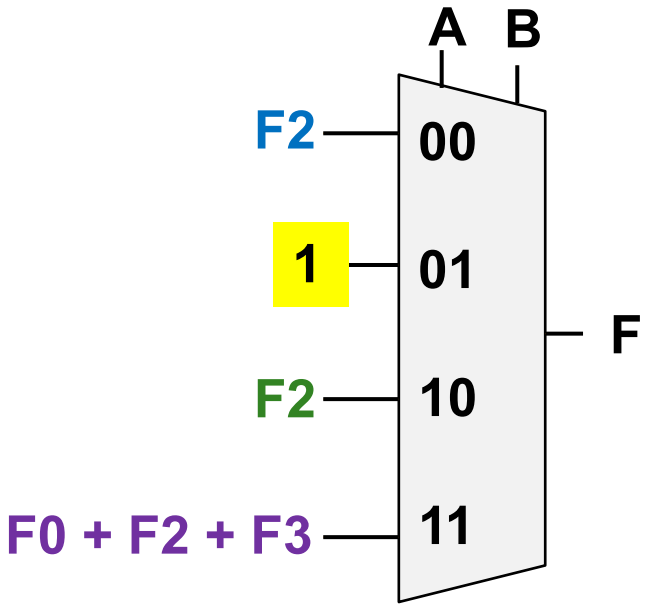


Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

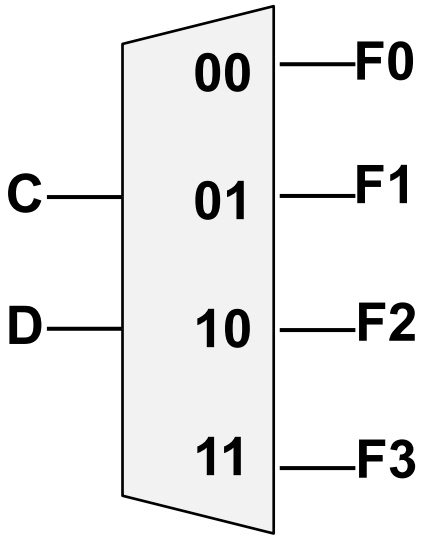


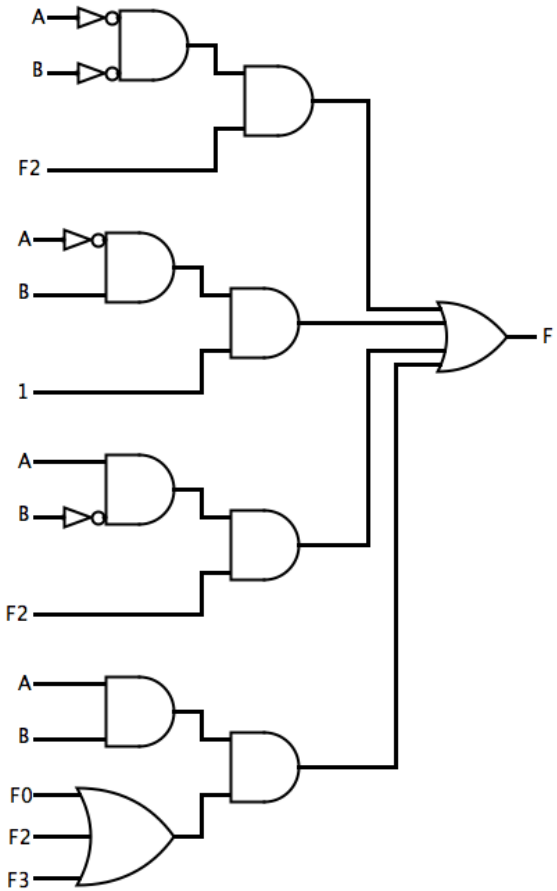


Exercício 3 – DECOD 2:4

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1





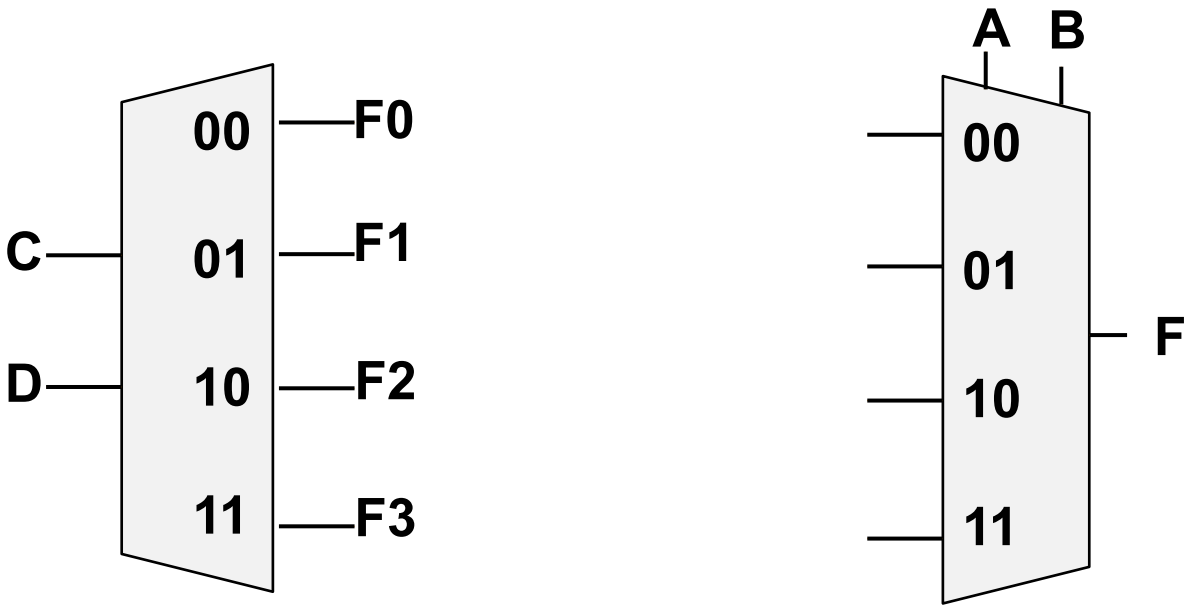
$$F(A,B,C,D) = \overline{A}\,\overline{B}(F2) + \overline{A}B(F1 + F2 + F3 + F4) + A\overline{B}(F2) + AB(F0 + F2 + F3)$$

$$F(A,B,C,D) = \overline{A}\,\overline{B}(F2) + \overline{A}B(1) + A\overline{B}(F2) + AB(F0 + F2 + F3)$$

Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$



Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

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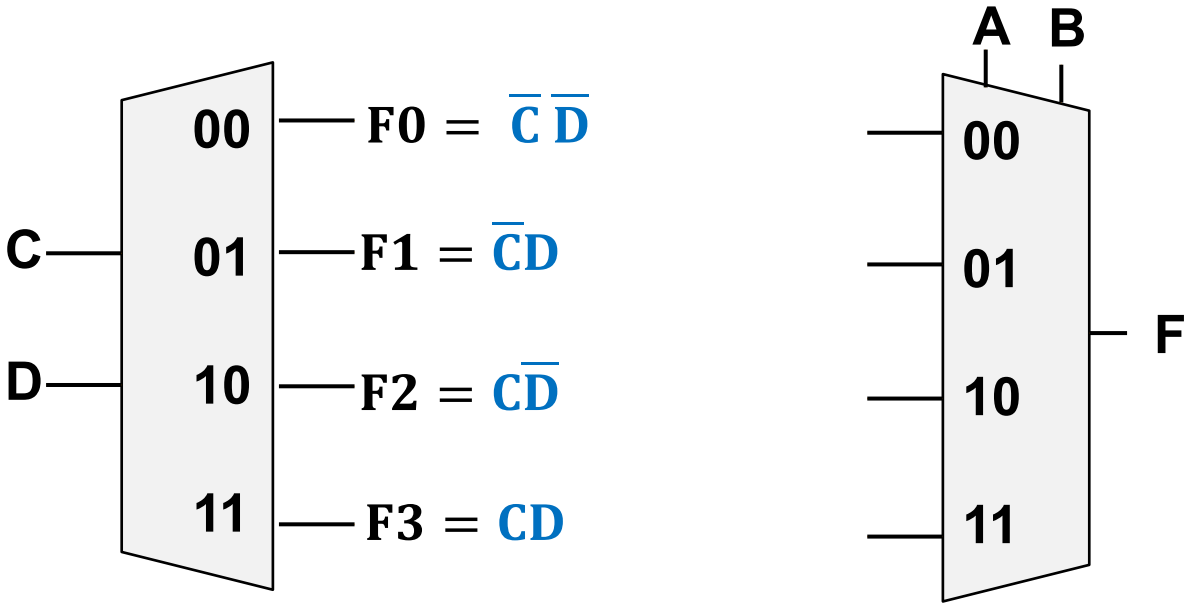

Exercício 3 – DECOD 2:4 + MUX 4:1

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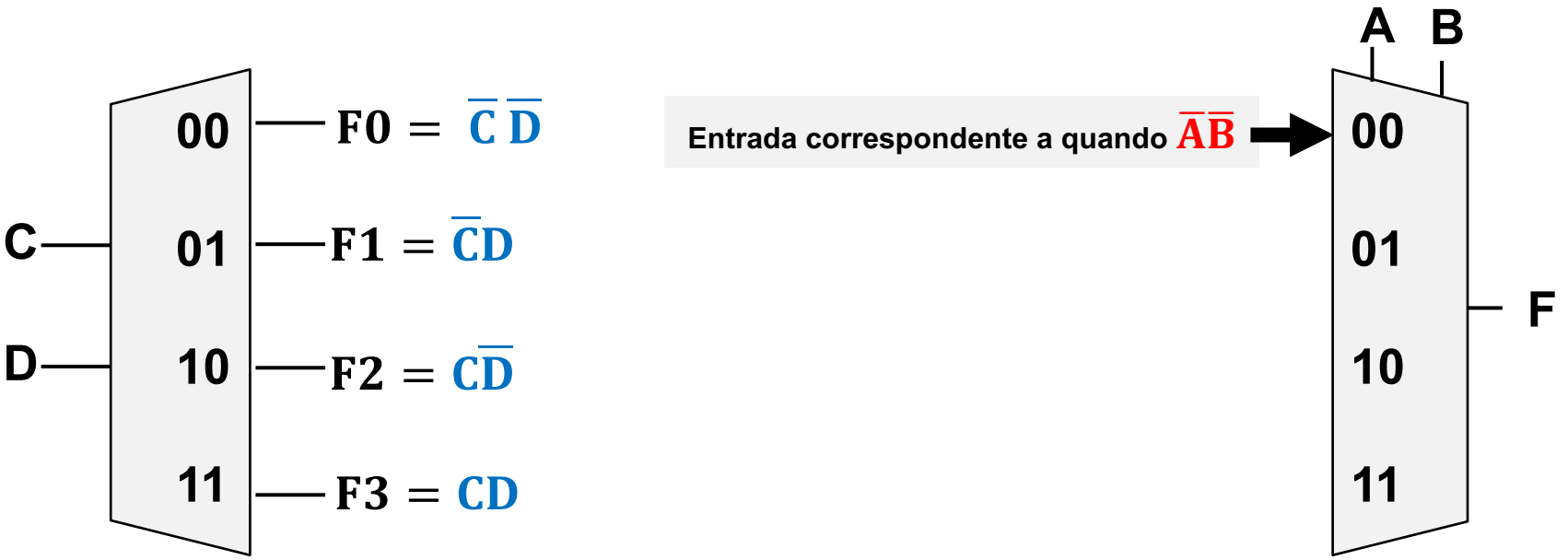

Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

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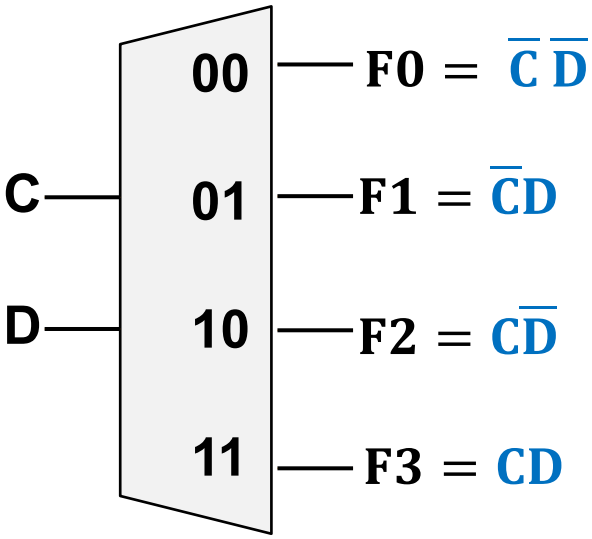

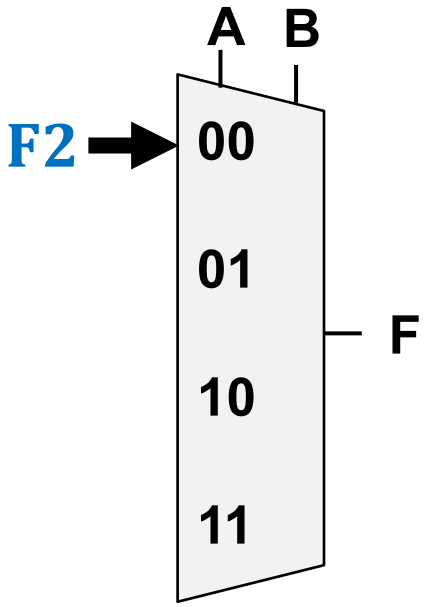

Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

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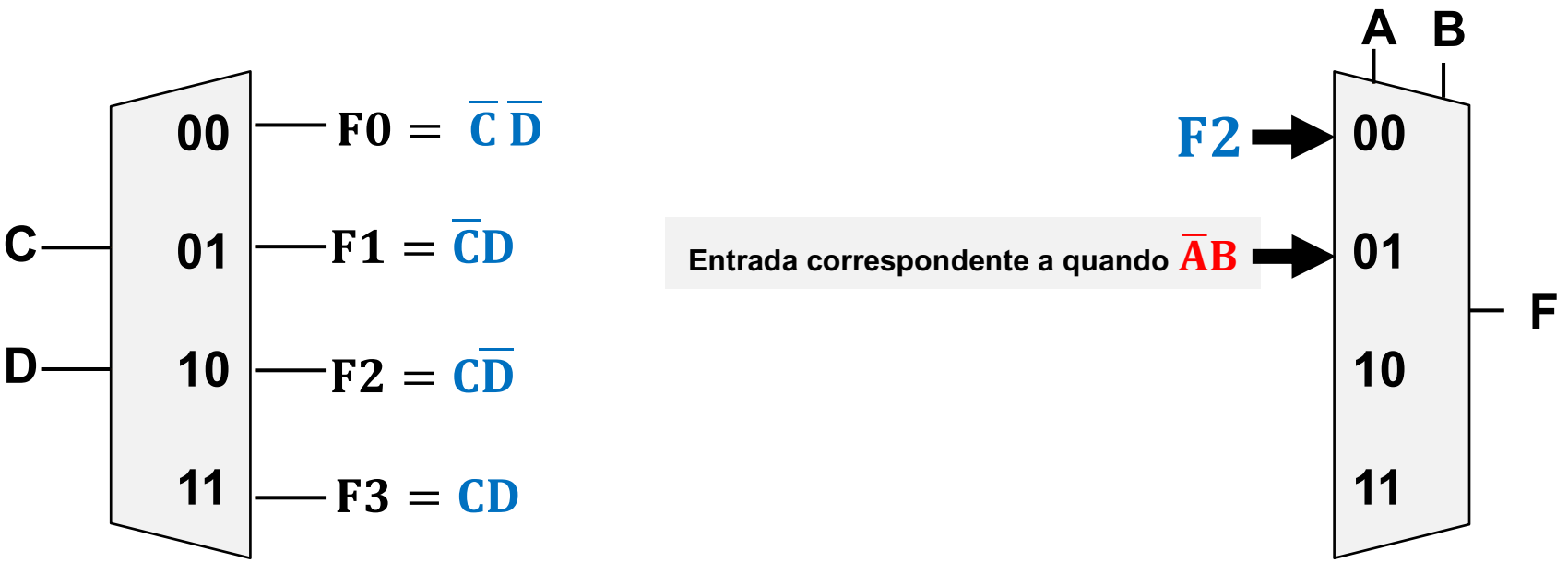

Exercício 3 – DECOD 2:4 + MUX 4:1

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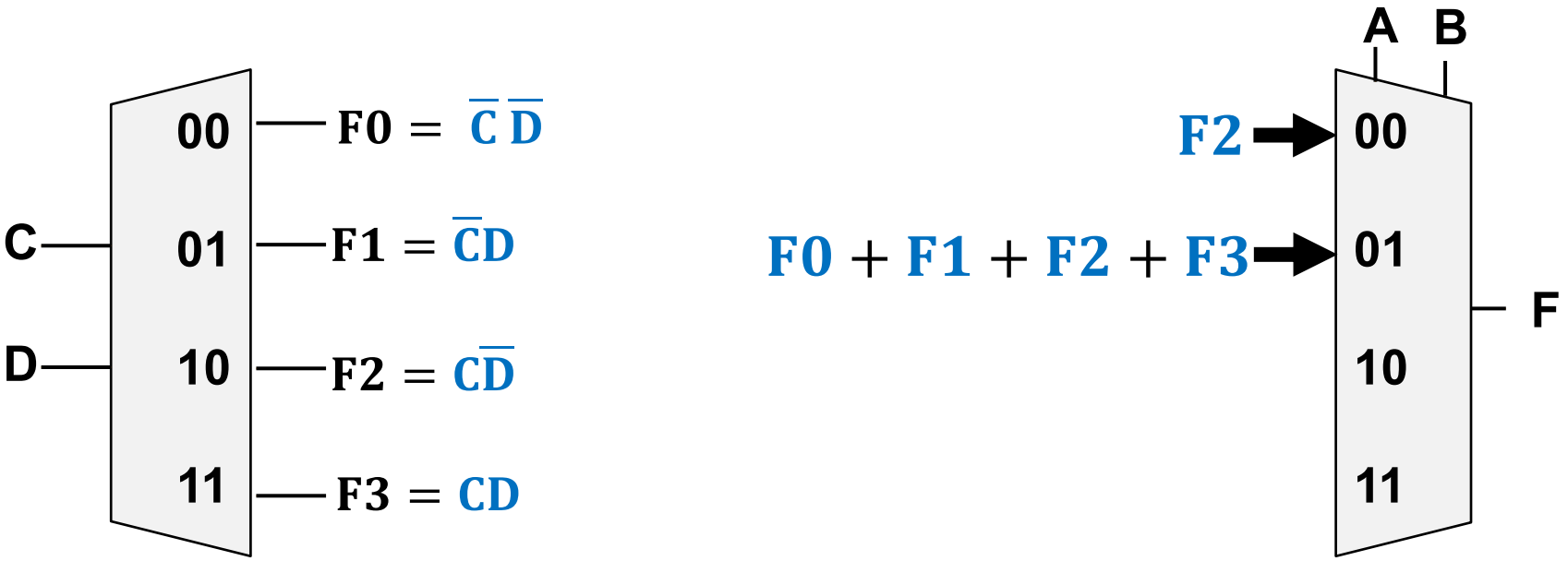

Exercício 3 – DECOD 2:4 + MUX 4:1

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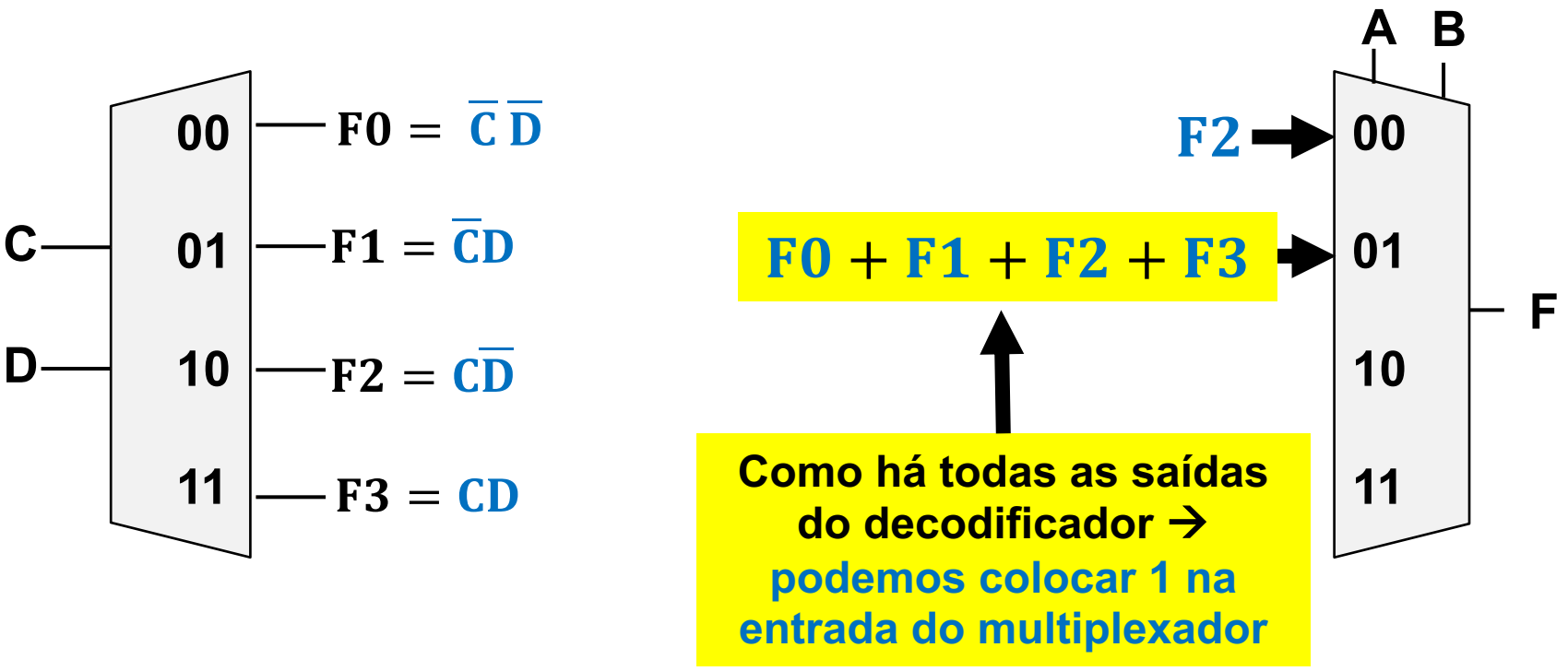
$$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$



Exercício 3 – DECOD 2:4 + MUX 4:1

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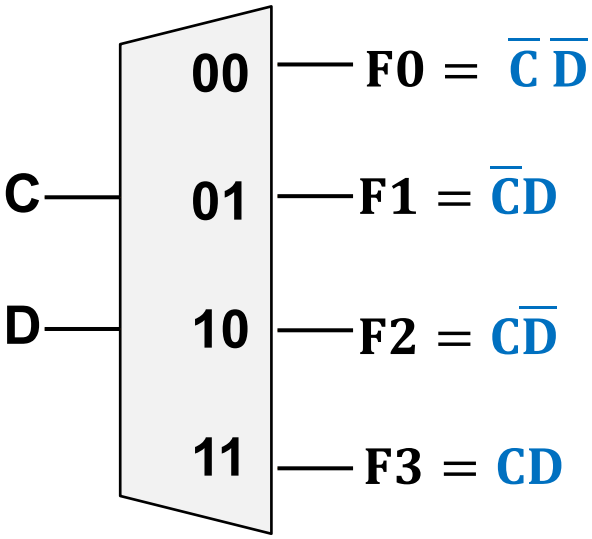

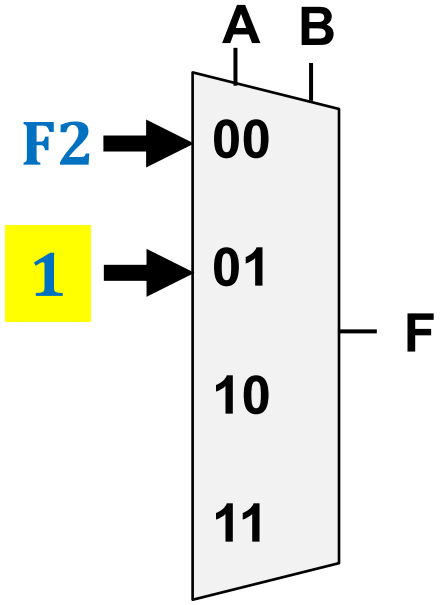

Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

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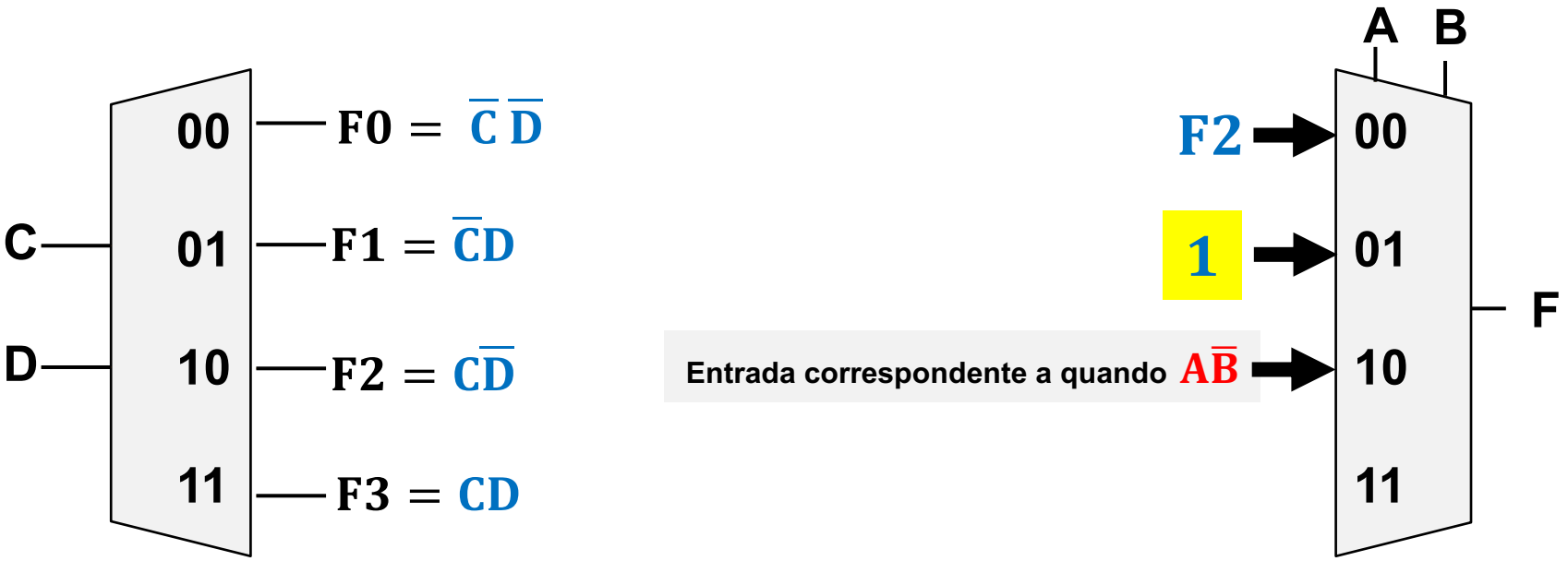
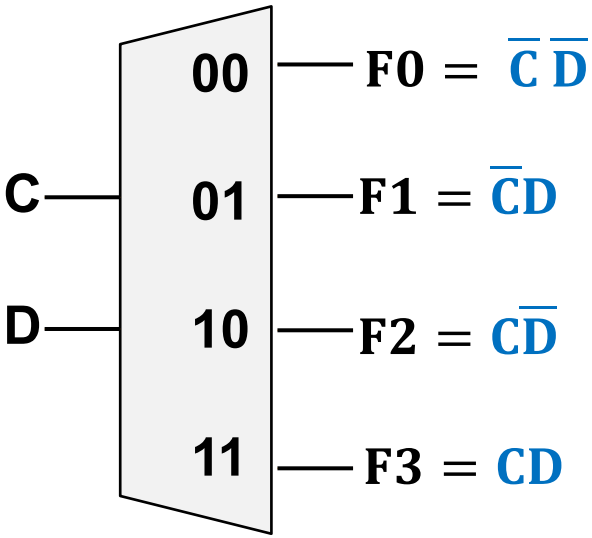
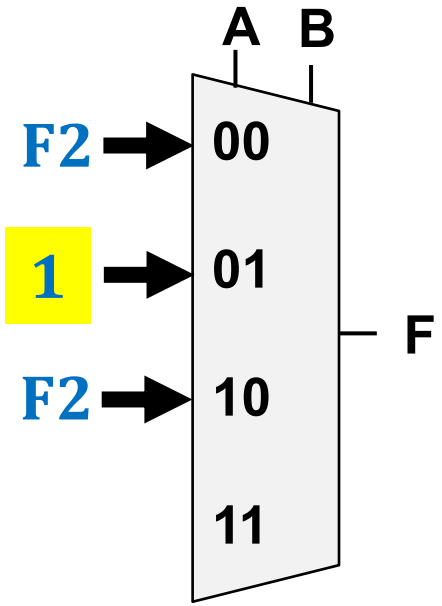


Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

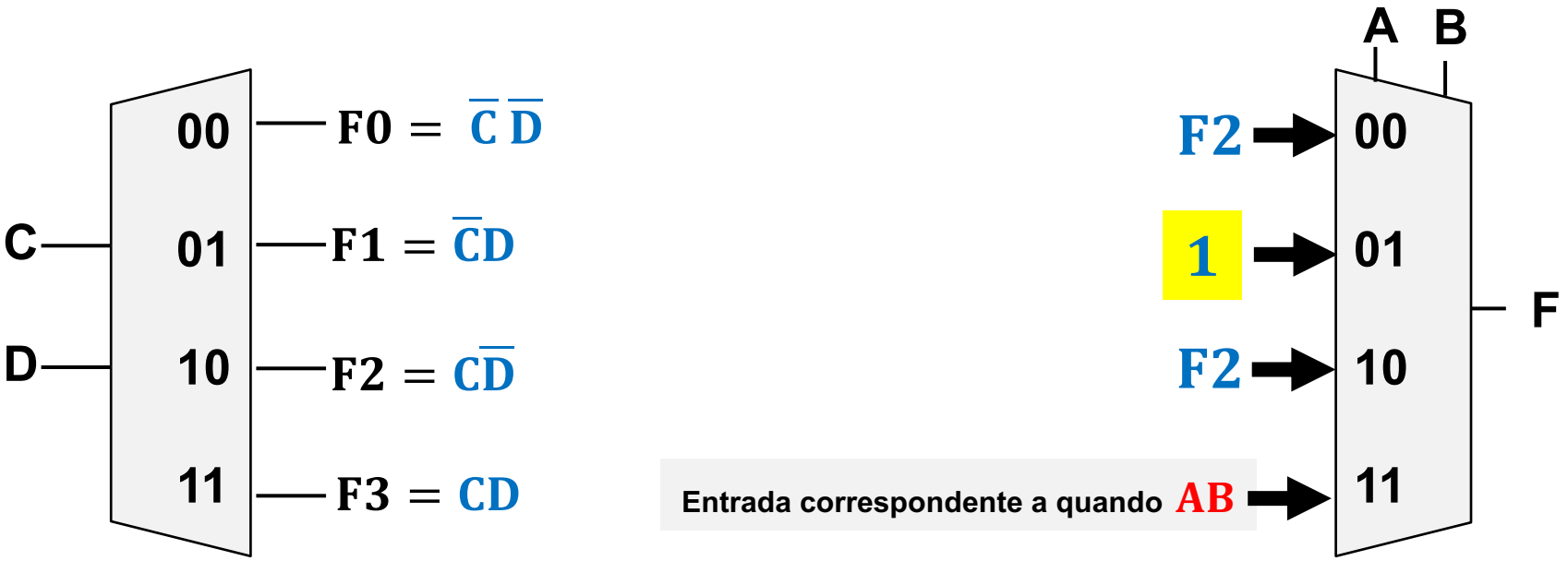




Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

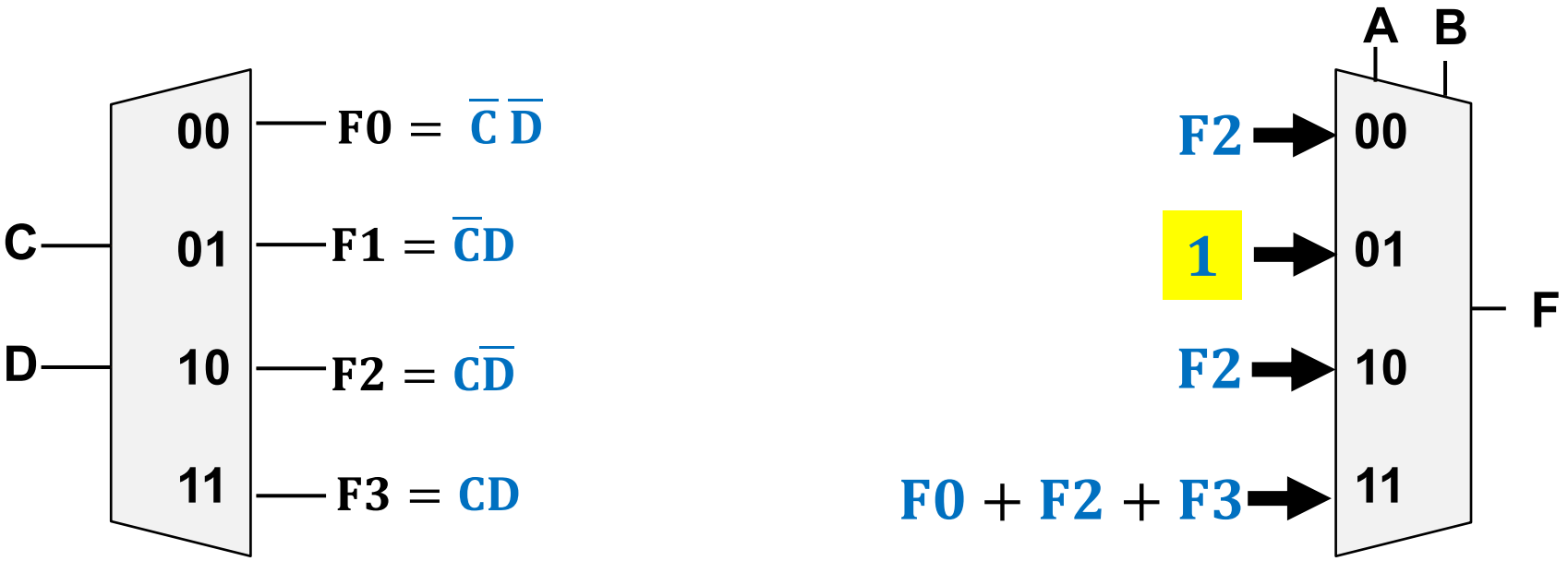
$$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$



Exercício 3 – DECOD 2:4 + MUX 4:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

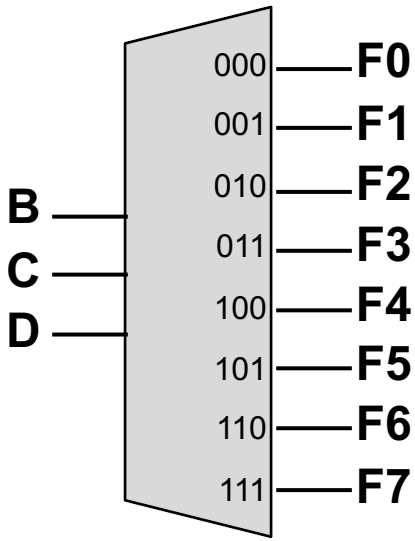
$$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}CD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

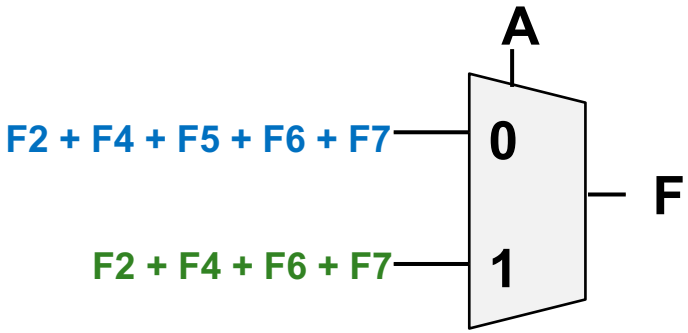


Exercício 3 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

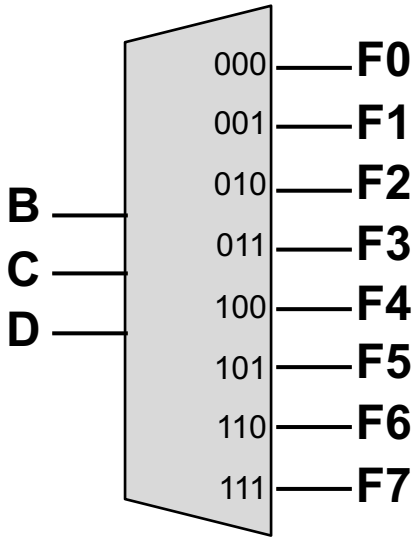


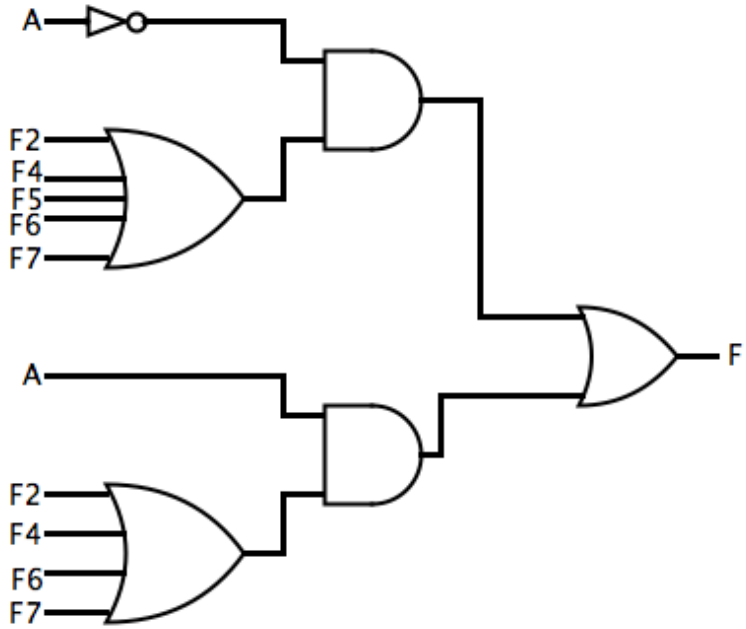


Exercício 3 – DECOD 3:8

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1



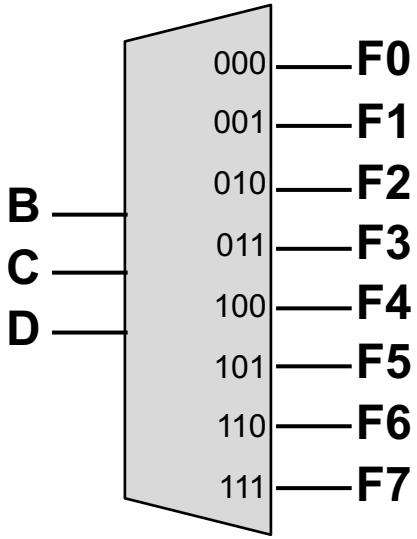


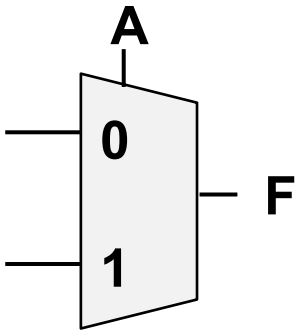
$$F(A,B,C,D) = \overline{A}(F2 + F4 + F5 + F6 + F7) + A(F2 + F4 + F6 + F7)$$

Exercício 3 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$

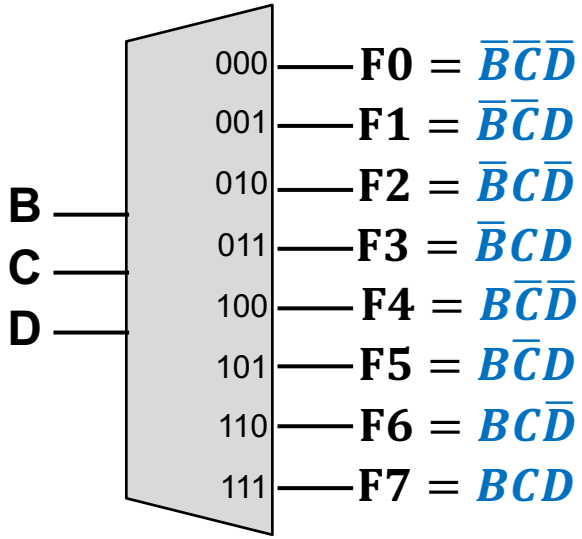


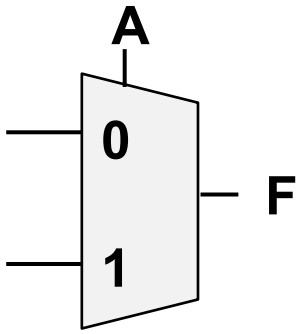


Exercício 3 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$





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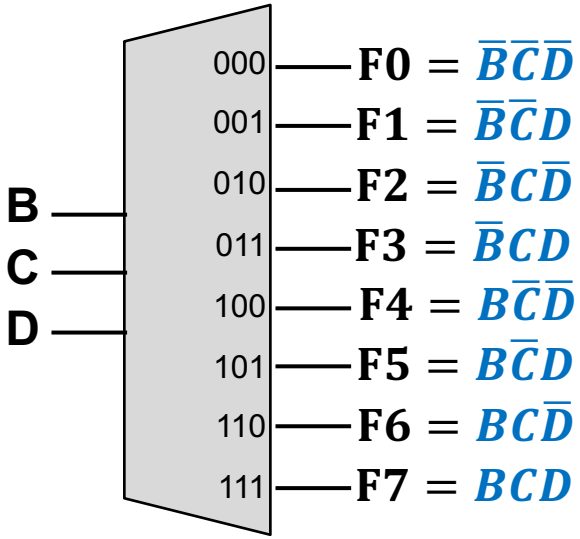

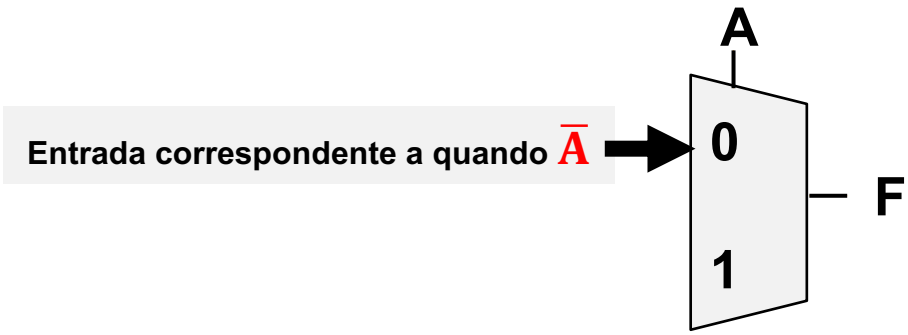

Exercício 3 – DECOD 3:8 + MUX 2:1

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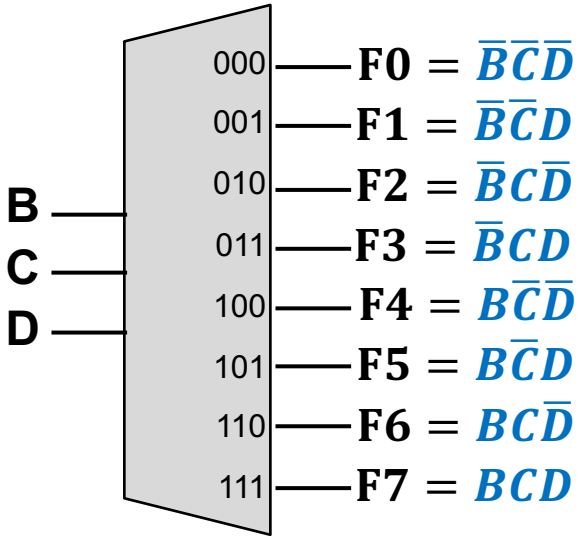
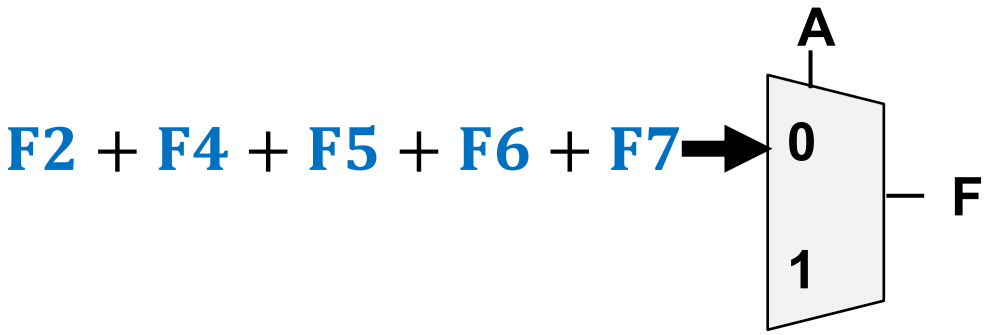
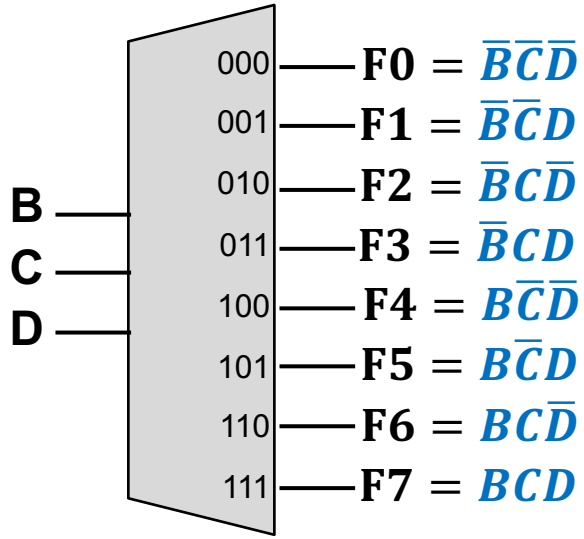


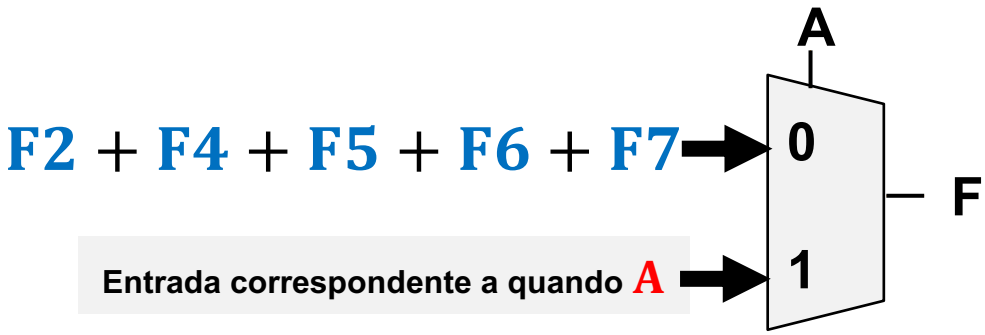


Exercício 3 – DECOD 3:8 + MUX 2:1

- **EXEMPLO:** $F(A,B,C,D) = \sum m(2,4,5,6,7,10,12,14,15)$

$$F(A,B,C,D) = \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}BCD + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABCD$$





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