Contents

Practico 3

1)

a)

A	B	C	D	S
0	0	0	0	0
0	0	0	1	**1**
0	0	1	0	**1**
0	0	1	1	0
0	1	0	0	**1**
0	1	0	1	0
0	1	1	0	0
0	1	1	1	**1**
1	0	0	0	**1**
1	0	0	1	0
1	0	1	0	0
1	0	1	1	**1**
1	1	0	0	0
1	1	0	1	**1**
1	1	1	0	**1**
1	1	1	1	0

b)

Miniterminos:

S = A'B'C'D + A'B'CD' + A'BC'D' + A'BCD + AB'C'D' + AB'CD + ABC'D + ABCD'

Maxiterminos:

S = (A+B+C+D) * (A+B+C'+D') * (A+B'+C+D') * (A+B'+C'+D) * (A'+B+C+D') * (A'+B+C'+D) * (A'+B'+C+D) * (A'+B'+C'+D')

c)

Partamos de la suma de miniterminos.

S" = (A'B'C'D + A'B'CD' + A'BC'D' + A'BCD + AB'C'D' + AB'CD + ABC'D + ABCD')"

=((A'B'C'D)' * (A'B'CD')' * (A'BC'D')' * (A'BCD)' * (AB'C'D')' * (AB'CD)' * (ABC'D)' * (ABCD')‘)'

d)

2)

a)

A	B	C	D	E	Err
0	0	0	0	0	0
0	0	0	0	1	0
0	0	0	1	0	0
0	0	0	1	1	0
0	0	1	0	0	0
0	0	1	0	1	0
0	0	1	1	0	0
0	0	1	1	1	1
0	1	0	0	0	0
0	1	0	0	1	0
0	1	0	1	0	0
0	1	0	1	1	1
0	1	1	0	0	0
0	1	1	0	1	1
0	1	1	1	0	1
0	1	1	1	1	0
1	0	0	0	0	0
1	0	0	0	1	0
1	0	0	1	0	0
1	0	0	1	1	1
1	0	1	0	0	0
1	0	1	0	1	1
1	0	1	1	0	1
1	0	1	1	1	0
1	1	0	0	0	0
1	1	0	0	1	1
1	1	0	1	0	1
1	1	0	1	1	0
1	1	1	0	0	1
1	1	1	0	1	0
1	1	1	1	0	0
1	1	1	1	1	0

b)

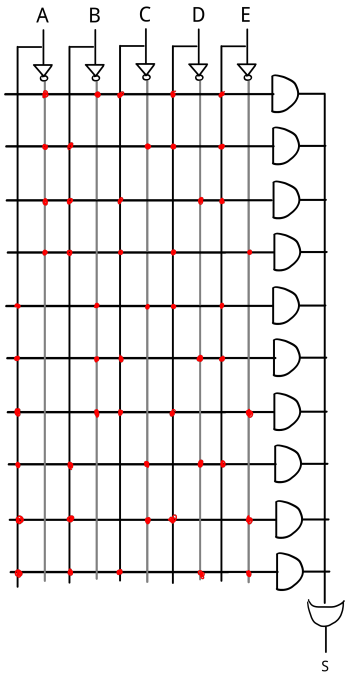
Miniterminos:

S = A'B'CDE + A'BC'DE + A'BCD'E + A'BCDE' + AB'C'DE + AB'CD'E + AB'CDE' + ABC'D'E + ABC'DE' + ABCD'E'

Maxiterminos: S = (A+B+C+D+E) * (A+B+C+D+E') * (A+B+C+D'+E) * (A+B+C+D'+E') * (A+B+C'+D+E) * (A+B+C'+D+E') * (A+B+C'+D'+E)

* (A+B'+C+D+E) * (A+B'+C+D+E') * (A+B'+C+D'+E) * (A+B'+C'+D+E)
* (A+B'+C'+D'+E') * (A'+B+C+D+E) * (A'+B+C+D+E') * (A'+B+C+D'+E)
* (A'+B+C'+D+E) * (A'+B+C'+D'+E') * (A'+B'+C+D+E) * (A'+B'+C+D'+E')
* (A'+B'+C'+D+E') * (A'+B'+C'+D'+E) * (A'+B'+C'+D'+E') *

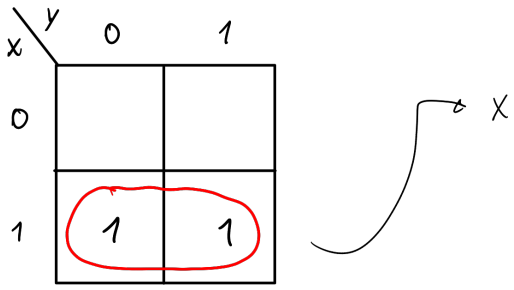
c)



3)

a) $x.y + x.y'$

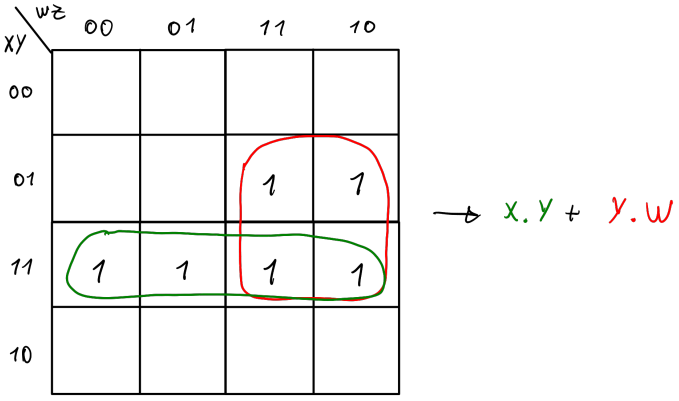
x	y	F
0	0	0
0	1	0
1	0	1
1	1	1


y
x
0
1
0
1
1
1
X

f) y.(w.z' + w.z) + x.y

x	y	w	z	y.(w.z'+w.z)	x.y	f
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	1	0	0	0	0
0	0	1	1	0	0	0
0	1	0	0	0	0	0
0	1	0	1	0	0	0
0	1	1	0	1	0	1
0	1	1	1	1	0	1
1	0	0	0	0	0	0
1	0	0	1	0	0	0
1	0	1	0	0	0	0
1	0	1	1	0	0	0
1	1	0	0	0	1	1
1	1	0	1	0	1	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

S = x'ywz' + x'ywz + xyw'z' + xyw'z + xywz' + xywz


wz
xy
00
01
11
10
00
01
11
10
1
1
1
1
1
1
1
1
x.y + y.w

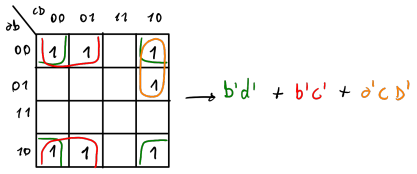
4)

a)

(f_1)

x3	x2	x1	x0	F(x3,x2,x1,x0)
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	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

S = a'b'c'd' + a'b'c'd + a'b'cd' + a'bcd' + ab'c'd' + ab'c'd + ab'cd'

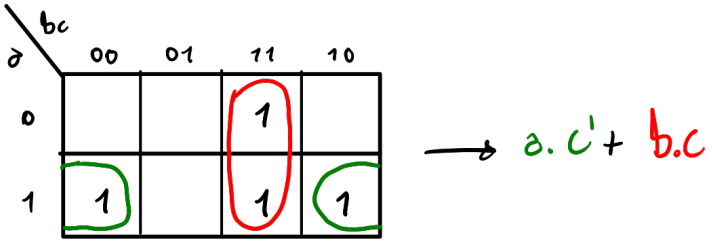

ab \ cd
00 01 11 10
00 1 1 1
01 1
11
10 1 1 1
b'd' + b'c' + a'c d'

c)

(f_3)

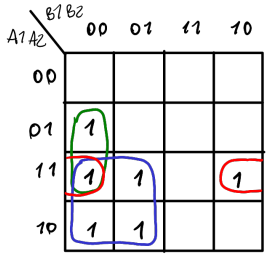
x2	x1	x0	F(x2,x1,x0)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

S = a'bc + ab'c' + abc' + abc

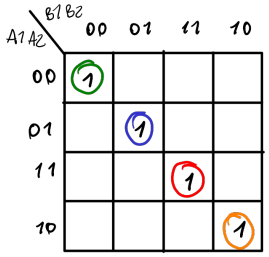


5)

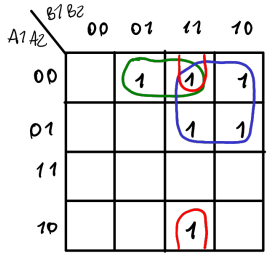
A1	A2	B1	B2	M	I	m
0	0	0	0	0	1	0
0	0	0	1	0	0	1
0	0	1	0	0	0	1
0	0	1	1	0	0	1
0	1	0	0	1	0	0
0	1	0	1	0	1	0
0	1	1	0	0	0	1
0	1	1	1	0	0	1
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	0	1	0
1	0	1	1	0	0	1
1	1	0	0	1	0	0
1	1	0	1	1	0	0
1	1	1	0	1	0	0
1	1	1	1	0	1	0



$\rightarrow A_2 B_1' B_2' + A_1 B_1' + A_1 A_2 B_2'$

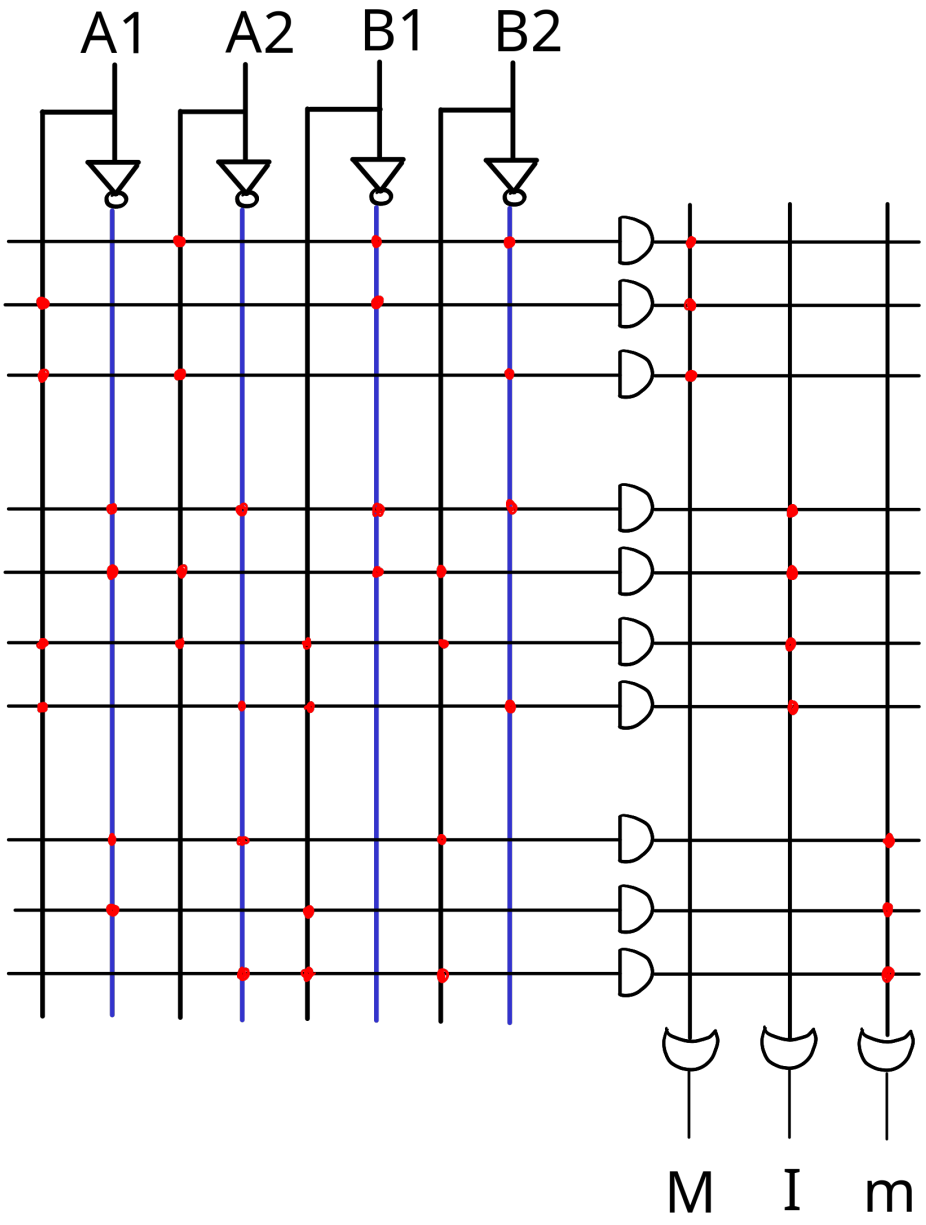


$\rightarrow A_1' A_2' B_1' B_2' + A_1' A_2 B_1' B_2 + A_1 A_2 B_1 B_2 + A_1 A_2' B_1 B_2'$



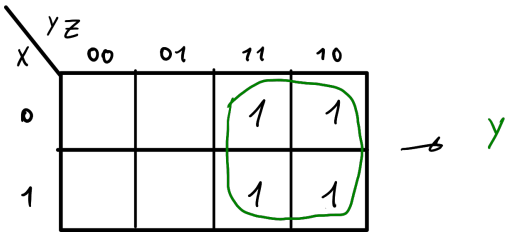
$\rightarrow A_1' A_2' B_2 + A_1' B_1 + A_2' B_1 B_2$

d)



6)

x	y	z	xyz	x'y	xyz'	F
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	1	0	1
0	1	1	0	1	0	1
1	0	0	0	0	0	0
1	0	1	0	0	0	0
1	1	0	0	0	1	1
1	1	1	1	0	0	1



7)

A)

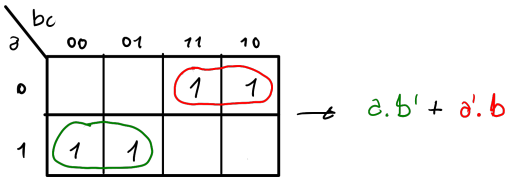
a)

$$\underbrace{\underbrace{(ab' + a'b)}_{XOR} + \underbrace{((b.c).(c.a)' + (b.c)'.(c.a))}_{XOR}}_{OR}$$

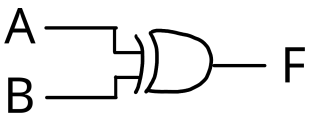
b)

a	b	c	b.c	c.a	(ab' + a'b)	(b.c).(c.a)' + (b.c)'.(c.a)	F
0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0
0	1	0	0	0	1	0	1
0	1	1	1	0	1	1	1
1	0	0	0	0	1	0	1
1	0	1	0	1	1	1	1
1	1	0	0	0	0	0	0
1	1	1	1	1	0	0	0

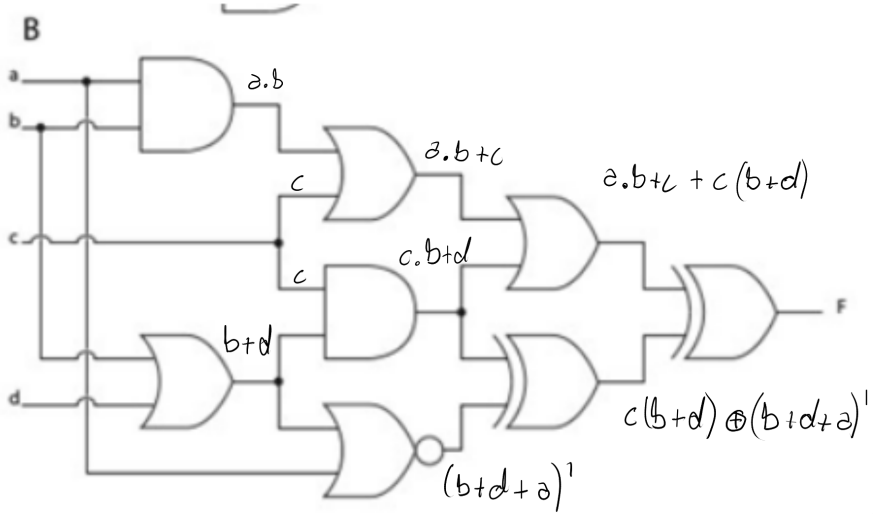
c)



d)



B)



$F = ((a.b) + c) + c.(b + d) \oplus c.(b + d) \oplus ((b + d) + a)'$

8)

a)

A_1	A_0	X_3	X_2	X_1	X_0
0	0	1	1	1	0
0	1	1	1	0	1
1	0	1	0	1	1
1	1	0	1	1	1

b)

Producto de maxiterminos:

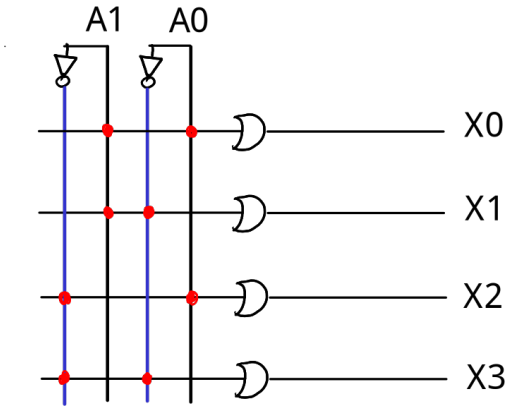
$X_0 = A_1 + A_0$

$X_1 = A_1 + A_0'$

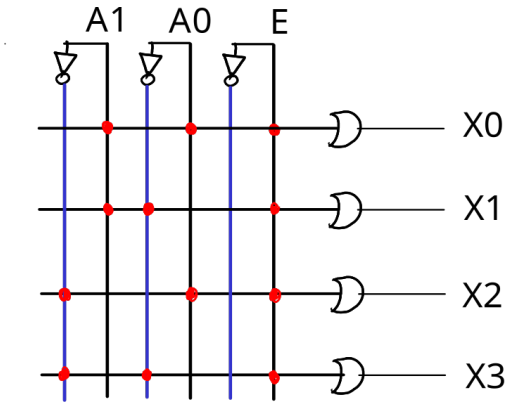
$X_2 = A_1' + A_0$

$X_3 = A_1' + A_0'$

d)

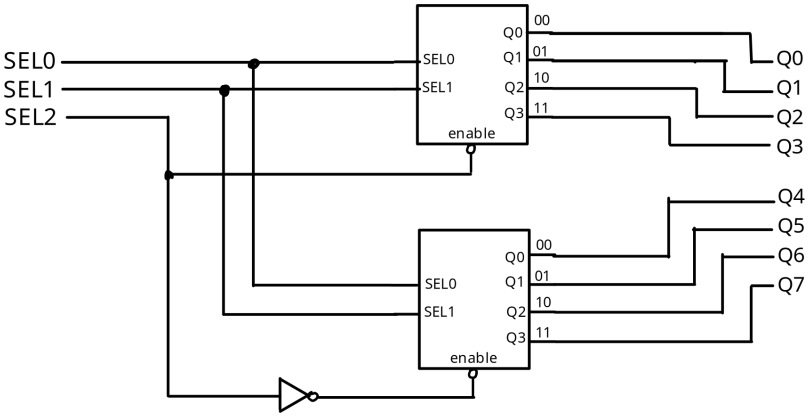


e)

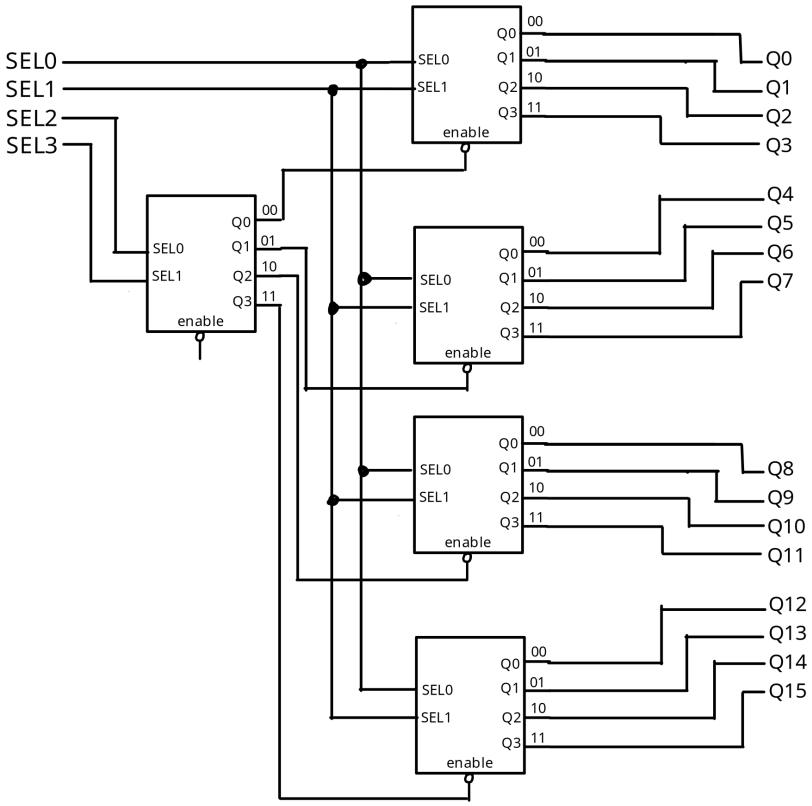

A1
A0
E
X0
X1
X2
X3

9)

a)

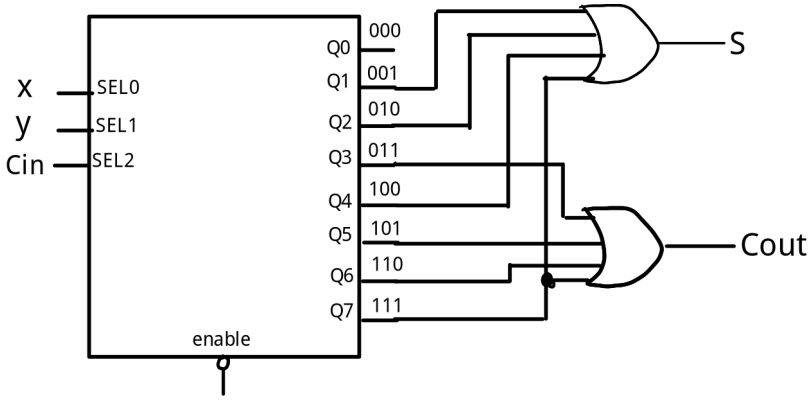

SEL0
SEL1
SEL2
SEL0
SEL1
enable
Q0
Q1
Q2
Q3
00
01
10
11
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7

b)

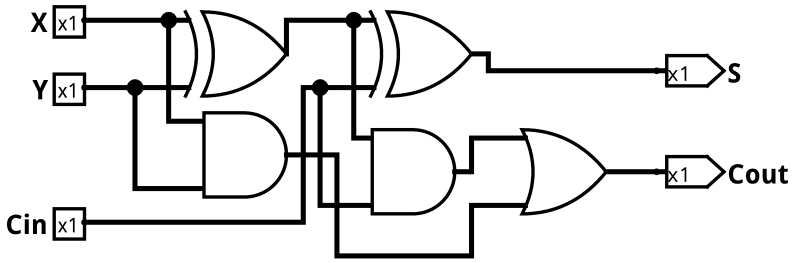

SEL0
SEL1
SEL2
SEL3
SEL0
SEL1
enable
Q0
Q1
Q2
Q3
00
01
10
11
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15

10)

a)


x
y
Cin
SEL0
SEL1
SEL2
enable
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
000
001
010
011
100
101
110
111
S
Cout

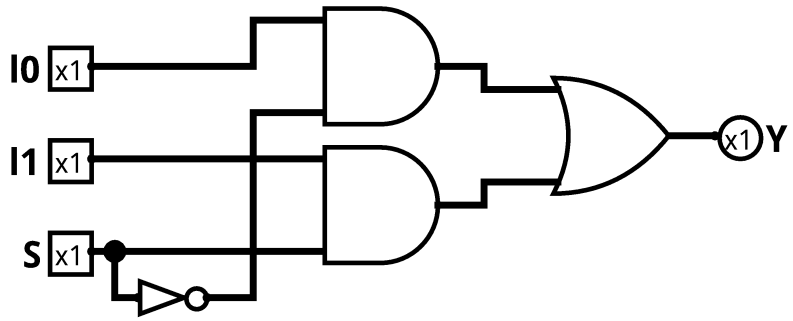
b)



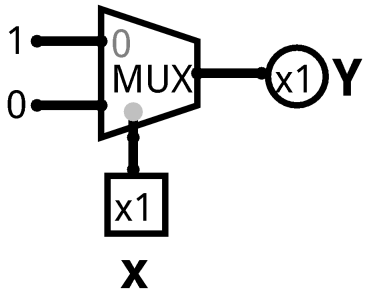
11)

a)

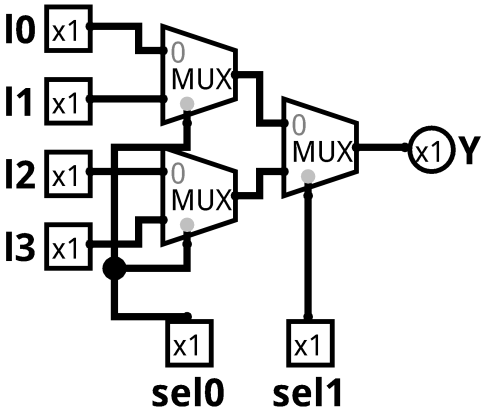
S	l_0	l_1	Y
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1



b)



c)



d)

1) Agregar N/2 MUX en la primer columna y que su entrada de seleccion esté conectada a la entrada menos significativa
2) Agregar la mitad de MUX que la vez anterior a la siguiente columna y conectarlos a la siguiente entrada de seleccion menos significativa
3) Repetir el paso anterior hasta tener una sola salida